MAT-92-05

Feasibility of Co-operative Snow Control Initiatives

Ontario

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Date Published: March, 1992

Published by: Research and Development Branch, MTO

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Abstract: Seasonally erected snow fences help to reduce the severity of winter road hazards and are therefore, an important component of the Ministry of Transportation of Ontario's (MTO) maintenance operations. The reduction in available resources in recent years has resulted in a reduction in the number of sites protected by snow fences. This study investigates the feasibility of alternative methods of managing the installation of snow fences which reduce the staff resources required and minimize environmental impacts. The objectives of the study are to:

- investigate the feasibility of delegating to landowners, the responsibility for installing and maintaining seasonal snow fences and/or living snow hedges on their property adjacent to highway snow drifting sites, and if deemed feasible;
- prepare a model agreement for such services.

Study components include: review of the research and extension literature pertaining to joint snow control ventures with landowners; contact with other Departments of Transportation to discover possible precedents; focus group meetings with several groups of Ontario farmers to obtain landowner views; review of current MTO costs of snow control activities, and finally; formulation of a model landowner agreement specifying the roles and responsibilities of both the landowner and MTO in co-operative snow control activities.

Based on the findings of the study, it was determined that there are sufficient economic and environmental advantages, and enough landowner interest in the concept, to warrant initiating pilot projects. Such pilot projects will provide opportunity to field test with landowners, the logistics of co-operative ventures including standard snow fencing, living snow fences and standing rows of corn. In addition, compensation requirements of landowners could be determined. The study results also indicate clearly that no one co-operative alternative can be expected to be universally acceptable to landowners or to Ministry staff. A flexible approach to implementation of co-operative snow control is recommended to maintain and possibly strengthen the historically good rapport that patrol staff have achieved with landowners.

Comments: This report examines the benefits and feasibility of co-operative management of snow control barriers along provincial highways.

Key Words: winter maintenance, snow fence, snow hedge, snowdrifing, co-operative management

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Published by
The Research and Development Branch
Ontario Ministry of Transportation

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March 1992

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Acknowledgements

The study team members would like to express their appreciation to those who facilitated the successful completion of this research project.

District Engineer John Godin (Stratford), and Maintenance Supervisors John Holdsworth and Jim Warner (London), Elmer Skov (Chatham) and Les Carr (Owen Sound), in consultation with their respective patrol foremen, were most helpful in identifying landowners to participate in the focus group meetings, and in developing structure for the meetings. The landowners contributed their valuable time and helped ensure that the project reached practical conclusions.

The efficient and thoughtful direction provided by David Manning and Max Perchanok of the Research and Development Branch is gratefully acknowledged. In addition, the cheerful and capable word processing expertise offered by Esther Rogas, Ecologistics Limited, is greatly appreciated.

"This report is published without prejudice as to the application of the findings."

1/ Introduction

Seasonally erected wood-slat-and-wire snow fences are an important component of the Ministry of Transportation of Ontario's (MTO) winter maintenance operations. Strategically located snow fences can help to reduce deep snow accumulation and ice build-up on roads, thereby reducing the severity of driving hazards.

In the Province of Ontario, snow fencing operations are administered through two statutes. The erection of fences along Provincial Highways is controlled by the Public Transportation and Highway Improvement Act (Government of Ontario, 1981a) which states:

> *The Minister or any person authorized by him may enter upon any land adjacent to the King's Highway without the consent of the owner and may erect and maintain snow fences thereon subject to payment for such damage as is suffered by the owner of the land so entered upon...*
>
> *Section 30(8)*

The same legislation allows MTO to plant trees on highway rights-of-way and to pay private landowners up to 75 cents for each tree approved by MTO for planting on land adjoining provincial highways. The Snow Roads and Fences Act, administered by the Ministry of Municipal Affairs, gives similar power to municipalities regarding snow fencing activities alongside municipal roads, for which provincial subsidies are provided. Pertinent portions of these two Acts are contained in Appendix A.

Current snow fence operation procedures were developed at a time when Ministry staffing policies allowed sufficient resources to be committed for the annual installation and removal of snow fences on private land. These procedures are labour intensive and must be carried out in the short time period between harvest and freeze-up, and between snow melt and spring tillage operations. The restriction on operating funds and staffing levels in recent years has resulted in increasing difficulties in committing staff time to the installation of snow fences. Consequently, the number of sites protected by snow fences has been reduced, requiring increased plowing and use of abrasives and chemicals.

Increasing awareness of sustainable development issues in all government operations raises the additional concern that protection from drifting snow be carried out with minimal impact on the environment. This concern can be addressed through the development of operating procedures which minimize the use of resources, fuel, material and labour for control of drifting snow. This includes minimization of mechanical snow plowing through the optimum use of snow fence or hedges.

A potential approach to maintaining winter road safety in an environment of dwindling staff resources, and supporting the initiative of environmental sustainability, is through co-operative or joint management of snow control activities with landowners. This study identifies issues which relate to the feasibility of co-operative snow control on Ontario highways, and prepares recommendations which would allow such a program to proceed on a trial basis.

1.1/ Study Objectives

In light of the recognized need for continued winter road safety and MTO's legislative mandate over snow control activities along provincial highways, this study was commissioned to examine the management alternatives for increasing the effectiveness and reducing environmental impacts, of roadside snow control activities. The focus of the study is on determining the social and economic feasibility of snow control initiatives managed jointly with landowners, using snow control methods currently prescribed by MTO. These methods include the erection and dismantling of snow fences, as well as the planting and maintenance of trees serving as "living" snow fences or hedges. Some discussion also centers on the feasibility of leaving standing rows of corn as a snow control option.

Specifically, the study objectives are to:

- investigate the feasibility of delegating to landowners, the responsibility for installing and maintaining snow fences and/or hedges on their property adjacent to highway snow drifting sites, and if deemed feasible,
- prepare a model agreement for such services.

2/ Methodology

The study methodology included several steps to ensure that the objectives were addressed comprehensively. Table 1 outlines the study components, the accompanying rationale and related tasks. Component #5, formulation of a model landowner agreement, was pursued only after the feasibility of co-operative snow control ventures had been determined from the previous steps and in consultation with MTO.

3/ Study Findings

3.1/ Research and Extension Literature - Co-operative Snow Control

A literature review indicates that very little has been documented to date on the topic of landowner participation in snow fencing and snow hedging activities in Canada.

The information pertaining to snow fences cited in provincial government technical manuals and other research studies tends to focus on the technical design aspects of snow control. Detailed specifications for effective snow fencing and hedging design and the engineering principles that govern configuration, installation and storage capacity of snow fencing are defined in MTO standards and other literature (Ontario Ministry of Transportation and Communications, 1979 and 1981; Musser, 1982; Shaw, 1987 and 1990; Baker and Williams, 1990; Perchanok, 1991).

Table 1/ Study Methodology

Study Component	Rationale	Tasks
1. Review current legislation, MTO installation and maintenance specifications, research and extension literature	• to identify the legislative framework and operations context in which snow control activities currently occur • to assess the socio-economics of co-operative snow control ventures in other jurisdictions	• obtained relevant documents from MTO • conducted computerized literature search through the University of Waterloo • obtained literature through other personal contacts.
2. Contact other Departments of Transportation	• to determine the existence of co-operative snow control precedents and other related research projects	• contacted all provincial and related U.S. Departments of Transportation. Road superintendents or engineers in selected western Ontario counties were also contacted (see Appendix B for contact list)
3. Focus group meetings with landowners	• to review the co-operative concept and the potential role landowners - primarily farmers - could play • to obtain input from landowners on topics such as logistics (who purchases, stores and repairs fences), compensation and liability	• met with farmers in Elmira (Stratford District), Cookstown (Owen Sound District) and Chatham (Chatham District)
4. Review of MTO cost and staffing data	• to enable comparisons of costs and labour of existing operations with the resources required under co-operative ventures	• reviewed MTO maintenance management system records (1988-1990)
5. Formulate a model landowner agreement	• to clearly specify the roles and responsibilities of both the landowner and MTO in co-operative snow control activities	• formulated model agreement, using findings from the literature, focus groups and other related agreements.
6. Formulate conclusions and recommendations	• to provide guidance to MTO's research and operations planning related to joint snow control ventures	

Much of the available literature referred to in this section originates from the American Midwest and describes co-operative living snow fence programs as opposed to structural snow fence programs. Reference to technical design cited in this section serves to provide an overview of the types of existing snow control activities in which landowners could potentially participate.

3.1.1/ Living Snow Fences

A living snow fence is a tree or shrub windbreak planted adjacent to and usually parallel to a road for the purpose of storing snow and preventing hazardous road conditions or road closures caused by drifting snow. Although the concept of using tree and shrub rows as snow barriers along roads is not new, relatively little information has been documented to date on this practice in Canada.

In Ontario, the Maintenance Operating Instruction M-700-A; Snow Fences and Hedges suggests a planting distance from the edge of the windward shoulder of the road of 15 times the eventual height of the hedge (Ontario Ministry of Transportation and Communications, 1981). However, due to the current width of most rights-of-way along two-lane Ontario roads, this is rarely attainable. Therefore, it is common practice to establish living snow hedges as far back from the shoulder as possible within the existing right-of-way to a maximum distance of 15 times the height. (see Appendix C for MTO Maintenance Operating Instructions).

The density of a snow fence refers to the ratio of solid area to total frontal area (Shaw, 1989). Research in the United States has shown that densities of approximately 50% provide optimum snow storage capacity (Shaw, 1990). Although it is more difficult to attain desired densities with living snow hedges than with wooden snow fence structures, species selection and alternate spacing of adjacent rows can control, to some degree, the density ratio. While theories prescribe the height and density for optimum effectiveness of snow hedges, the design attributes of many hedges are constrained by on-site conditions and secondary objectives of the hedge.

An effective design for a snow hedge arrangement along Ontario roads incorporates two rows of coniferous trees, alternately spaced to eliminate gaps in the lower one third of the hedge, with an overall porosity of 60 - 70% (Perchanok and Cain, 1991). The snow hedge should extend at least 10 m beyond and parallel to the ends of the road area needing protection to counteract the decrease in snow storage capacity near the end of a barrier which results from scouring. More porous species (e.g. deciduous shrubs) are preferable for this section of the snow hedge.

Government initiated programs have been established in Ontario to assist landowners in establishing windbreaks. The Land Stewardship II Program (LSP II) offers incentives to farmers for planned conservation systems and environmental protection measures (Ontario Ministry of Agriculture and Food, 1990). This program makes financial assistance available for the establishment of windbreaks along fence rows to protect adjacent fields against wind erosion. In instances where windbreak establishment is along adjacent roads, the additional benefits of snow control may be recognized. However, to date, this program does not specifically allocate funds for windbreaks used for snow control.

Conservation Authorities also promote and undertake reforestation planting projects on private land (Neumann, 1991). These projects include personal assistance and tree planting services for windbreaks. Not unlike the Land Stewardship II Program, additional benefits of snow control may be realized from shelterbelt establishment, but the objectives of these projects seldom specifically include snow-control benefits alongside roads.

Elsewhere in Canada, the province of Saskatchewan conducted a pilot project in the late 1970's using hedges for snow control (Appendix E). Although the project proved successful, no further work was reported to have been undertaken with living snow fences. The Prairie Farm Rehabilitation Administration (PFRA) is a federal government program that provides windbreak services to prairie farmers for a variety of conservation and wildlife habitat needs. PFRA responds to provincial government requests for nursery stock and assists in the establishment of shelterbelts throughout the prairie provinces. In southeast Manitoba, some

interest has been shown recently for PFRA involvement in a living snow fence venture along sections of major highways. However, to date no work has been conducted (Neill, 1991).

Last year, a pilot project was conducted between the Ministère Des Transports du Québec and two active farming enterprises, to compare the effectiveness of leaving a select number of rows of corn standing adjacent to a road, with the conventional wooden snow fencing method of storing snow. Preliminary observations were made, with continuation of the experiment planned for the winter of 1991-1992 (see Appendix E).

Research and practical experience in the American Midwest have demonstrated that replacing an existing wooden slatted snow fence with a living shelterbelt offers a long-term solution to the annual problem of whiteouts and road closures caused by drifting snow. Potential benefits that can be derived through the introduction of living snow fences include:

- a cost-effective alternative to wooden snow fencing as a result of reduced installation and maintenance costs and an increase in the life expectancy of the living shelterbelt over the wooden snow fence;
- a natural area for wildlife habitat;
- improved snow control due to greater snow storage capacity;
- an effective means to reduce soil erosion and provide livestock shelter, and;
- improved roadside aesthetics (Nickerson, 1982; Shaw, 1987; Musser, 1982).

However, living snow fences also exhibit some disadvantages relative to structural snow fences. They require an initial development stage of 3 to 5 years before they attain a 1.2 m height and become an effective snow storage system (Nickerson, 1982). As well, they are difficult to establish in shallow, droughty, or rocky soils. A living snow fence will occupy more land area. Finally, an effective living snow control system must be set back an adequate distance from the road to provide a sufficient drop zone and prevent roadside drifting. This often requires that it be established on privately owned land beyond the road easement, thereby removing potentially good agricultural land from production, or otherwise modifying existing land uses.

Living snow fence programs undertaken in co-operation with landowners in the U.S. are described in the following section.

3.1.2/ Approach to Landowner Participation in Living Snow Fence Programs

Landowner participation and joint snow control ventures are concentrated in American Midwestern states. Kansas, South Dakota, Colorado, Nebraska and Iowa have formulated active living snow fence programs that involve the landowners as an integral part of all project undertakings. With the co-operation and active participation of various government agencies, private naturalist clubs and the public, these programs have developed into successful and beneficial ventures. Table 2 addresses the logistics of each program, including responsibilities relating to establishment, maintenance and compensation.

The key component of each of these programs is the willingness of the landowners to provide a suitable land area for the initiation of a living snow fence project. Once access to the land has been assured, each state implements specific agreements with the landowners. Generally the landowner is responsible for pre-planting site preparation and annual maintenance of the site for the duration of the living snow fence. Appendix D presents some typical working agreements a landowner enters into prior to the establishment of a windbreak. Each of these agreements is signed collectively by the various participants and outlines the specific responsibilities of each participant.

Landowner compensation varies between states, depending on the program. While some sort of compensation (e.g. monetary or enrolment into a Wildlife Habitat Program) is offered to the landowner through most programs, the State of Colorado has developed a unique program in which the landowner offers the use of the land at no cost to the program. Most landowners agree to this as they foresee the possible benefits accruing from a living snow fence. In addition to the benefits mentioned in Section 3.1.1 these advantages include a greater likelihood that highways will be snow-free, especially during winter emergencies and so that buses are able to safely transport children to and from school (Shaw, 1991).

Table 2/ Living Snow Fence Programs

State/Program Name	Details of Program
Colorado Interagency Living Snow Fence Program	• membership includes Department of Transportation, Soil Conservation District members, Division of Wildlife and Soil Conservation Service committee persons • sites are selected and landowners are contacted by SCS personnel to determine willingness to participate in venture • landowners are asked to provide sites at no charge since no funds are available to purchase easements • planting plans are formulated to determine what physical resources are required • landowners are responsible for preparing the site, providing a tractor for planting • Soil Conservation District supplies the planting machine, the Colorado State Forest Service donates the seedlings, and the planting crew is comprised of local co-operators • including spring of 1991, 184 living snow fences have been established.
Nebraska Living Snow Fence Program	• for the program to be started, landowner co-operation is required • in some Natural Resource Districts (NRD's), landowner is enrolled in the Private Lands Habitat Program as compensation • the Habitat Program pays the landowner a certain dollar amount per acre, per year for the living snow fence area under contract • other NRD's do not recognize the Living Snow Fence Program in their Habitat Programs and therefore alternative arrangements are made with the landowner. These include the purchase of a long-term easement from the landowner or a donation of the land by the landowner with provision for a calving and feeding area on the leeward side of the living snow fence.
Iowa Wind Erosion Control Incentive Program (WECIP)	• the Iowa Department of Transportation and the Department of Natural Resources work together in assisting Iowa landowners to preserve their soil • the landowners are paid for the use of their land for 10 years • the landowner chooses the type of windbreak he would like adjacent to the highway

Table 2/ Living Snow Fence Programs

State/Program Name	Details of Program
Iowa Wind Erosion Control Incentive Program (WECIP) Continued	· the landowner controls the use of the land and maintains the windbreak after the second year · WECIP is financed by an annual appropriation of $100 000 from the Road Use Tax Fund.
Kansas Interagency Living Snow Fence Program	· an active committee has been formed to promote, plant and maintain living snow fences · membership includes Forestry Division, Department of Wildlife and Parks, Department of Corrections, Soil Conservation Service, Department of Transportation, Kansas Wildlife Federation, and the County Engineers Association · all committee members are responsible for promoting the advantages of living snow fences to the public · landowners who agree to participate in the program are required to provide the land, prepare the site for tree planting and leave the living snow fence in place for 20 years · landowners who participate in the program are enrolled in the Kansas Department of Wildlife and Parks Wildlife Improvement Program.
South Dakota Living Snow Fence Program	· Department of Transportation will select locations where living snow fences are needed · representatives from DOT, the Division of Forestry, and the local Conservation District meet with the landowners to explain the program · co-operative landowners sign a Living Snow Fence Highway Use Easement Agreement · landowner is responsible for preparing site, maintaining living snow fence and permitting access by the State to the site · landowner is compensated with monetary funds for site preparation, per acre easement pay, and annual maintenance tasks · local Conservation District plants the trees.

Although popular support for co-operative living snow fence programs appears to run high in the American midwest, one cannot conclude that the same enthusiasm would arise immediately in Ontario. Several significant differences in context can be observed including:

- land values in the midwest are much lower, ranging from $500 to $1100/ha for dryland wheat farming, which increases the attractiveness of non-cropping alternatives;
- average farm size is much larger in the midwest, contributing to greater management flexibility;
- the increase in soil moisture resulting from snow drift melt is viewed as a strong asset in dryland farming areas, whereas in Ontario, where early planting of spring grains maximizes yield potential, it is often viewed as a liability;
- midwest landowners appear to appreciate the wildlife habitat enhancement benefits (e.g. deer, pheasant), whereas Ontario farmers generally do not view increasing deer populations favourably;
- the high level of long-term institutional support in the U.S. for conservation efforts including windbreak/shelterbelt plantings. For example, living snow fence programs in Colorado have ongoing financial and technical support of the State Forest Service, the USDA's Soil Conservation Service and Forest Service, the Colorado Division of Wildlife, the State Highway department and several other agencies (Shaw, 1991). Canadian programs are non-existent or short-term by comparison (OMAF, 1990; Agriculture Canada, 1991);
- local communities in the midwest have actively encouraged youth groups (e.g. 4-H, boy scouts), service clubs and sportsmen's clubs to take part in bettering the environment while enhancing road safety by establishing living snow fences.

3.1.3/ Comparative Costs - Living Versus Standard Snow Fences

Among the many benefits that can be derived through establishing living snow fences as opposed to structural snow fences are the long-term monetary savings. Savings have been demonstrated in parts of the U.S. Although comparative cost figures did not appear in the Canadian literature, studies conducted across the great plains states in the U.S. have indicated that some savings are feasible by establishing a living snow fence. For example,

Table 3 outlines a 3-way cost comparison between the installation of a permanent 1.4 m picket snow fence, a 4.2 m Wyoming-design snow fence structure, and a 3-row living snow fence. (A Wyoming-design snow fence structure is essentially a permanent, extended version of a standard slatted snow fence. Its larger size provides it with a far greater snow storage capacity).

Two important implications arise from the data in Table 3. First, service life is an important factor in the economics of snow barriers (Shaw, 1990). The relatively long life expectancy of a living snow fence eliminates the periodic replacement costs associated with wooden snow fence structures. As well, once living snow fences have established satisfactory root system and above ground growth, annual maintenance costs are virtually eliminated.

Table 3/ Comparison of Installation Costs for Structural and Living Snow Fences - Colorado

Fence Type	Height (m)	Snow Storage when Full (tonnes/m)	Service Life (years)	Installation Cost (U.S. $/km)	Unit Cost (U.S. $/km/year)
Picket (permanent)	1.4	16.1	7	4 350	807
Wyoming	4.2	200.0	35	29 530	2 281
3-row living	6.1	203.0	75	9 940	700

Source: Modified from Shaw, 1990.

Note:
1. These are 1986 U.S. dollars per kilometre of snow fencing estimated using a standard annualizing formula and a 7% discount rate (measured net of inflation). These costs are incomplete in that they omit operating and maintenance costs over the life of each barrier.
2. The snow retention capacity of the three options is not factored into the unit cost because it is not clear how the reported figures relate to retention capacity requirements in Ontario.

Second, the annualized installation cost of the 3-row living snow fence is less than the cost of both structural fencing options. The cost analysis would be even more favourable to the living snow fence option if associated maintenance costs, which are virtually zero for living snow fence, were to be included in the comparison of all three options.

A snow fence feasibility study sponsored by the Wyoming Highway Department over the course of a 5-year period in the mid 1980's anticipated similar monetary savings through the

use of living versus structural snow fences. Although a final report for this project has yet to be completed, it was estimated that a living snow fence should cost about U.S. $43 500/km over its 50 year life expectancy or U.S. $3200/km/year (Musser, 1982). This included the cost of nursery stock, planting irrigation, protective fencing, and maintenance. By comparison, the same department, in 1984, spent approximately U.S. $55 900 on materials and installation for a kilometre of 3.7 m high wooden snow fence. Eighty-two cents a year was spent to maintain each linear metre of this fence over its 25-year life expectancy. The annualized cost of this option is therefore estimated to be U.S. $5600/km. This represents a yearly savings of U.S. $2400/km by establishing a living snow fence as opposed to a structural snow fence. These data are summarized in Table 4.

Table 4/ Cost of Snow Fence Options - Wyoming

Option	Installation Cost (U.S. $/km)	Life Expectancy (years)	Maintenance Cost/Year (U.S. $/km)	Total Annualized Cost (U.S. $/km)
Living Snow Fence	43 500	50	(included in capital cost, details not available)	3 200
3.7 m Wooden Snow Fence	55 900	25	820	5 600

Source: Modified from Musser, 1982.

Note: 7% discount rate net of inflation

3.2/ Contacts with Other Jurisdictions

While the preceding section identified specific snow control programs currently active in selected American states, this section outlines the results of a general mail-back survey conducted in June 1991, designed to assess provincial and state experience in snow control ventures. The survey instrument and results appear in Appendix E.

A review of the Canadian responses further emphasizes the lack of active joint snow control ventures throughout the country. In all cases, the provinces, through the Departments of Transportation (DOT), are responsible for the installation, maintenance, and removal of structural snow fences alongside provincial roads. Generally, landowners are informed by provincial DOT authorities of proposed annual installation and removal dates, and provincial legislation authorizes DOT staff to enter private property to erect and remove structural snow fences. Landowners have no involvement with these tasks. Appendix E also confirms the limited Canadian experience with living snow fences, as discussed in Section 3.1.1.

Aside from those states referred to in the previous section, American involvement in joint snow control ventures appears limited. Warmer winter months and reduced annual snowfalls have allowed New Jersey, Connecticut and southern New York to eliminate their snow fence programs. Several other states, through their DOT's, are responsible for the annual installation, maintenance and removal of snow fences on government and private lands. In Michigan and Indiana, snow fences are only erected along state owned rights-of-way.

With the exception of Wyoming, landowners receive no compensation from the state DOT. In Wyoming, the State Highway Department enters into perpetual easement agreements with landowners and pay $3.28 per lineal metre for this right.

The study team also contacted road engineers/superintendents in a sample of 11 counties or regional municipalities in southwestern Ontario. The intent of these calls was to determine whether there was any current or historical evidence of co-operative ventures with landowners in this area of the province.

Results of these contacts are noted in Table 5. None of the counties have programs involving landowners in fencing activities; in fact, use of fencing is in decline, with some counties no longer erecting any fence. Historically, Waterloo and Wellington Counties have purchased some land alongside a few roads for purposes of planting windbreaks for snow

Table 5/ Selected County/Regional Municipality Experience with Co-operative Snow Control Ventures

County/ Municipality	Contact	Related Experience
Brant	Mr. C. Spencer, Engineer	• building up and reconstructing roads at a back slope of 10:1 has reduced the need for fencing • it has not been necessary to date to compensate farmers where backsloping has extended on to private lands (topsoil is replaced following subsoil removal)
Bruce	Mr. Brian Knox, Engineer	• none • have not tried alternatives to standard snow fencing activities
Dufferin	Mr. S.E. Smart, Engineer	• none • putting up less snow fence each year • additional 20.1 m of right-of-way was purchased when some roads were widened 20-30 years ago, and pine/spruce trees planted as a windbreak; no landowner involvement
Elgin	Mr. Fred Grock, Engineer	• none • ceased erecting snow fence in 1989, due to milder winters, built-up roads and good snow removal equipment
Essex	Mr. Harry Kempster, Maintenance Yard Foreman	• none • less and less fencing is being erected due to landowner reluctance to have staff enter properties and milder winters • farmers don't like trees and they like to turn corn residue under quickly, especially on heavy soil

Table 5/ Selected County/Regional Municipality Experience with Co-operative Snow Control Ventures

County/ Municipality	Contact	Related Experience
Lambton	Mr. Steve Pasquin, Road Superintendent	• none • have not tried alternatives to standard snow fencing activities
Oxford	Mr. D. Pratt	• as above
Perth	Mr. T. Collings, Engineer	• none; no longer erecting snow fence
Simcoe	Mr. Taylor, Engineer	• none; erecting less fence each year
Waterloo	Mr. Brian Soehner, Engineering Approvals Supervisor	• none • had purchased land along a couple roads circa 1950 for planting 6 to 8 rows of Scotch pine 46 - 61 m back from edge of the road
Wellington	Mr. Al Holmes, Paul Johnson, Engineers	• 50 years ago, trees planted 30 m back from right-of-way on land purchased or leased (lease included in Appendix D) • where road foreman sees corn planted in snow fence location, they may informally negotiate with farmer to leave it standing for the winter

control; however, landowners were not involved with establishment or maintenance activities.

Wellington County has demonstrated some flexibility in snow control options by providing payment to several farmers each year for leaving a few rows of a corn crop standing in an appropriate location. However, agreements for this option are entirely informal, with payment to farmers based on average yield and price received over the rest of the field or payment-in-kind (e.g. a load or two of gravel) (Johnson, 1991).

Landowner agreements developed in the above jurisdictions appear in Appendix D.

3.3/ Meetings with Landowners

It was recognized early in the study that obtaining the views of those to be ultimately affected by any changes in snow control management activities was a crucial step in the study process. Consequently, meetings were held with small groups of farmers in Elmira (Kitchener Patrol), Cookstown (Cookstown North and East Patrols) and Chatham in July, September and October 1991, respectively. Participants were identified by the respective patrol supervisors as landowners/farmers along provincial highways who currently have snow fences erected on their properties by MTO.

The main topics for discussion raised at these meetings related primarily to the logistical practicalities of potential landowner involvement in fencing and hedging activities, including:

- individual versus group organization of tasks;
- responsibility for materials purchase, repair and storage;
- payment to landowners for their services (by time or unit of material, and amount);
- how to hold landowners accountable to the terms of agreement;
- liability, and;

- other possibilities and problems associated with living snow fences and standing rows of corn.

At the conclusion of the meetings, participants were asked to complete a brief response form, specifying their level of interest in co-operative snow control ventures, their primary concerns, and a few basic characteristics of their farming operations.

The following sections outline the results of these discussions related to standard and living snow fencing.

3.3.1/ Standard Snow Fencing

Organization of Tasks - All three groups generally agreed that it would be better to have individuals responsible for snow fencing activities on their own land, rather than try to organize some form of group effort. In one group, it was felt that many property owners would be more hesitant to have other landowners entering their property, than they would an "MTO supervisor with a white hat".

Complications could occur with absentee landowners where a property is leased to others, and where there could be a different lessee in the fall and in the spring. The owner living at some distance may not want snow fencing responsibilities, and keeping current with the status of tenancy could be difficult. It was suggested that in such situations, MTO could include the property on a neighbouring landowner's agreement (if the landowner agrees), or MTO could manage such sites.

Materials Management - It was generally agreed that under any co-operative venture, MTO should provide all materials - fence, posts, wire and specialized tools - to the farmers. Farmers would not be willing to lay out funds for materials and then wait for reimbursement from MTO. In addition, they felt that MTO could obtain discounts for volume purchases. One participant remembered when farmers used to be responsible for putting up fence, but the fences got shorter and shorter as materials deteriorated or disappeared.

There was general appreciation for the efficiencies of resource use associated with fence storage on-site. However, it was suggested that the agreement would have to provide for fencing stolen or damaged during storage, or ensure that such material be covered by the landowner's or MTO's insurance.

Compensation for Services - There was agreement that the preferred method of payment would be by the length of fence, preferably by the metre, as "rolls" can be of varying lengths. An hourly payment method could be easily abused by the landowner, and impossible to monitor by MTO staff.

There was some hesitancy by participants at the meetings to state, without more thought, what they felt was fair compensation for the combined services of erecting, removing and storing snow fence. Study team members emphasized that they should consider associated costs, including labour, use of equipment and storage space (assumed to be outdoors, off the ground, but uncovered). The only other reference point given to the participants for compensation estimation purposes was that MTO studies estimate that it takes approximately one man-hour to erect 10 m of fence, once all materials are at the site of installation (Perchanok, 1991).

The specific compensation dollar amounts suggested by the groups are specified in Section 3.4.1.

Landowner Accountability - It was understood during the course of the meetings that MTO would have the continued right to enter landowner property and perform whatever inspection services were necessary to ensure conformity with the terms of the agreement. The agreement could contain a clause regarding a time frame to re-set a snow fence if it blew down or otherwise specify exactly whose responsibility it would be under such circumstances. Non-payment to a landowner not providing the required service was considered an appropriate penalty by some meeting participants, although others felt that fines may need to be levied before some farmers would take their responsibility seriously.

Liability - Meeting participants were unanimous in their request to be absolved of any liability, should a road traffic incident be somehow associated with fencing they would have set up. Any agreement would have to have an "Act of God" clause. A patrol supervisor suggested that currently, MTO staff do not necessarily set up blown-down fence the next day, and couldn't recall liability ever being a problem in such cases.

3.3.2/ Living Snow Fencing

Meeting participants in all three areas had seen the soil erosion or snow control benefits of trees planted along roads. In spite of the benefits witnessed, most landowners reluctantly accepted the possibility of living snow fences being established on their properties. The main hesitations related to:

- taking expensive productive land out of production (i.e. a business loss);
- dividing up existing small fields further impairing the movements of farm equipment;
- the need for protective fencing where livestock are present, and;
- tree roots possibly clogging subsurface tile drains.

Concerns were also raised about the lag time between the planting of seedlings and the time when snow control benefits could be realized, and who maintains the trees during that period of time.

However, several individuals expressed either fairly strong interest, or guarded interest in establishing trees in areas along existing field or natural area (eg. watercourses) boundaries. The question arose of how much flexibility there would be on MTO's part in accepting plantings which varied considerably in distance from, and configuration with, the road. Participants were told that an ideal perpendicular distance from the road would be 15 times the eventual height of the hedge, although distances of up to 30 times the height could be considered. Each site would have to be evaluated on a case-by-case basis.

The meetings, included discussion about using corn as a "living" barrier. The Elmira group found this to be a more palatable idea than trees. Problems discussed included

strength/durability of corn stalks, the number of rows required, and how one would rotate the strip out of corn while still remaining at the specified distance from the road. It was suggested that compensation would have to cover the lost yield (i.e. it may not be harvestable in the spring) as well as a management or "aggravation" factor.

The most hesitation to the idea of leaving corn standing appeared to come from the Chatham group which was comprised mostly of cash crop operators. They pointed out the following considerations:

- at best, corn would be planted in a given field only every other year due to crop rotation;
- it is not practical to harvest four to eight rows in the spring, but if it is not harvested, fallen grain will germinate in the succeeding crop;
- heavy clay soils need to be fall-ploughed or the soil is difficult to work the following year; and
- corn that stands all winter is unsightly.

3.3.3/ Summary of Landowner Responses

Although the overall number of landowners who attended the meetings was low, conversation was animated and the groups represented a range of age and experience. At the close of the meetings, the participants were asked to rate, on a scale of 1 (no interest) to 4 (very interested) their level of interest in both snow fencing and hedging, and in the Chatham area, standing corn. The results are presented in Table 6.

The Elmira group was at the most, only slightly interested in both snow control activities, with the exception of one younger gentleman who indicated interest in fencing. Contributing factors to the low levels of interest include:

- several farmers run fair-sized maple syrup operations, the clean-up activities of which often overlap with spring tillage operations thereby absorbing available farm labour

when fences should be taken down. "Money won't replace time; it's a job that won't get done without hiring additional labour";

- one farmer runs a farm equipment fabrication shop which gears up for production about the time that snow fences should be set, and;
- meeting participants were all traditional Mennonite farm operators who sometimes are reluctant to identify too closely with "government" programs.

Table 6/ Level of Interest Expressed by Landowners in Co-operative Ventures

Location	No interest at all	Slightly interested	Somewhat interested	Very interested	Not answered	Total Respondents
Elmira						
snow fence	1	2	0	1	0	4
snow hedge	2	2	0	0	0	4
Cookstown						
snow fence	1	1	1	1	0	4
snow hedge	2	0	0	1	1	4
Chatham						
snow fence	5	3	1	1	0	10
snow hedge	5	1	1	2	1	10
corn	6	2	0	0	2	10

The Cookstown group expressed a broader range of interest, especially with regard to the fencing. Two of the operators did mention that MTO currently does a good job and should be given the resources needed to hire part-time help.

Fifty percent or more of the farmers at the Chatham meeting expressed no interest at all in involvement in any of the snow control activities. However, as with the other groups, there was a small proportion who were somewhat or very interested in the hedging or fencing options.

Overall, it appears that farmer enthusiasm does not run high for joint snow control ventures. While this may reflect the true feelings of some, it also reflects their hesitation to commit

to something which is more a concept than a tangible proposal to which they could respond more definitively.

3.4/ Analysis of Costs of Current MTO Snow Control Operations

Snow fencing

MTO provided various internal "maintenance operations reports" by their numbered districts for the fiscal years 1989, 1990 and 1991. These data showed yearly expenditures for erecting and removing snow fence (per metre basis).

In reviewing the data, it was decided to undertake a detailed analysis of MTO Districts 1 to 6 in Western Ontario and that the results would be representative of the province as a whole. Summary details with respect to each district analyzed are presented in Tables 1 to 3 in Appendix F of this report.

The data are compiled on an erected and removed basis, with a November 15 cut-off date in the fall of the year and an April 1 cut-off date in the spring of the year. Snow fence may be erected before or after November 15 and taken down before or after April 1; therefore, metres of snow fence erected and removed for one winter season may be accounted for in different years in the tables in the Appendix.

The analysis indicates that the number of metres of snow fence erected in Districts 1 to 6 varies from year to year. The change is apparently due to weather conditions and the availability of staff to complete the task. In general terms, however, the total volume of snow fence erected yearly by MTO is gradually declining.

The costs include all labour charges for the time expended in erecting the snow fence and posts, and includes loading and hauling of material to the various sites. The expenditures also include hourly charges for a tractor with a 3-point hitch and a front-end loader, charges for the use of post pounders, the supervisor's 1/2-ton truck on occasion, and internal hourly

rates for 3-ton trucks. Cost of the snow fence and overhead charges are not included in these costs.

A summary of the average costs based on MTO's recorded data for erecting and removing snow fence is presented below:

Fiscal Year	Average Cost per Metre of Snow Fence ($)	Cost per km ($)
1988-89	3.06	3 060
1989-90	3.10	3 100
1990-91	3.22	3 220

Living Snow Hedge

MTO does not have a large number of hedges being utilized for snow control purposes. However there are several locations scattered throughout the province where snow hedge is being used to advantage. These locations are generally along four-lane highways and two-lane highways where the right-of-way is wide enough to accommodate a snow hedge far enough from the highway to be effective.

The study team was provided with MTO in-house costs for planting coniferous trees and deciduous shrubs on a per kilometre basis. The costs do vary depending upon whether two rows, or three or more rows are planted and whether small seedlings or trees ranging from 60 cm to 100 cm in height are used. Tree spacing within the row also affects the costs.

Approximate costs to plant and establish one row of trees 60 cm in height, one kilometre in length and with trees spaced 1.25 m apart is:

Coniferous Trees	
800 trees @ $18.00	$14 400
Planting cost 800 @ $15.00	12 000
1st year watering, fertilizing, weed control, rodent control 800 @ $10.00	8 000
TOTAL	$34 400

Deciduous Shrubs	
800 shrubs @ $ 6.00	$ 4 800
Planting cost 800 @ $5.00	4 000
1st year maintenance cost 800 @ $5.00	4 000
TOTAL	$12 800

From the foregoing, it can be determined that one row of coniferous trees, 1 km long would cost $34 400 to establish versus $38 400 for three rows of deciduous shrubs. MTO normally plants one row of coniferous trees and three rows of deciduous shrubs but often two rows of coniferous trees will be planted for a better effect of snow control and to offset trees that may die off in one row in later years. A range of coniferous snow hedge establishment costs is noted in Table 7.

Table 7/ Summary Costs for Coniferous Snow Hedge Establishment

Number of Tree Rows	Coniferous Tree Plantings		
	Tree Spacing (m)	Tree Height (cm)	Cost/Km ($)
1	1.25	60	34 400
	1.25	100	42 400
	1.50	60	28 810
	1.50	100	35 510
2	1.25	60	68 800
	1.50	60	57 620

Source: MTO District #2, London.

In addition to the foregoing, there is normally some cost associated with preparing the area for tree planting purposes. This could include spraying the existing vegetation with a

defoliant and tilling the soil prior to planting the trees. Approximate costs for these activities is $200/km.

Alternatives to the foregoing would be to use seedling trees from the Ministry of Natural Resources but longer term maintenance is required to establish an effective snow hedge. Accordingly, MTO generally plants more mature trees and shrubs (in the 60 cm to 100 cm range).

In summary, the cost of living snow hedge can vary greatly depending upon the type, quantity and size of tree or shrub recommended or desired in a particular area. A mid range cost for a blend of coniferous trees and deciduous shrubs would tend to fall between $40 000 to $60 000/km for the first year. Assuming a 50 year life expectancy and a 7% discount rate (measured net of inflation, equivalent to a rate after inflation of about 12%), this is equivalent to an annual cost of $2900 to $4300 per km of snow hedge. These annual figures cannot be directly compared to the wooden snow fencing costs since these costs omit fence purchase cost and other capital costs.

3.4.1/ Landowner Compensation Expectations Under Co-operative Snow Control Programs

In section 3.4 the average costs incurred by Ministry of Transportation in District 1 to 6 for the past three years have been detailed. These costs are considered to be representative of the actual cost of erecting and removing snow fence.

At the meetings in the Elmira, Cookstown and Chatham areas, property owners were asked their opinion of fair compensation to erect, remove and store snow fence. Although some owners were reluctant to state an amount most provided an estimate on a confidential basis by writing on a piece of paper that was folded and handed to the discussion leader.

From the response received at Cookstown, the estimate on a per 15 m roll of snow fence ranged from $20.00 to $30.00 with $30.00 prevailing (approximately $2.00/m). Subsequent to the meeting at Elmira, the group presented an amount of $3.00/m as a compensation

estimate. Only three members of the Chatham group responded, with rates ranging from $2.00/m to $21.00/m. The highest value undoubtedly reflects disinterest in carrying out the task.

Prior to suggesting fair compensation, the landowners stated that a number of conditions would have to be satisfied. These items would form part of an agreement between MTO and the landowner/operator; there was general agreement about these items in the landowner meetings.

- The most appropriate method of payment would be a price per metre of installed fence.

- It is assumed that MTO would supply the required quantity of snow fence, steel posts and tie wires to the landowner, and they would remain in the care and control of the landowner during the term of any agreement. MTO would also supply, as a one-time item, if requested or needed, the twisting tool for fastening the snow fence to the steel posts with the tie wires.

- During the term of an agreement, MTO would be responsible for replacing any damaged rolls of snow fence and steel posts that would become bent or otherwise damaged upon determination that damage had occurred during fencing activities.

- Even if an agreement were made with the landowner to erect snow fence, there would still be some inspection required by MTO to ensure that the landowner had erected the fence by the specified date and that it was installed properly. The cost of this activity must be considered in arriving at a yearly amount to pay the landowner.

- MTO states that the life expectancy of snow fence is in the range of 15 to 20 years, depending on the quality of wood in each roll of fence and, the care taken in handling and the amount of maintenance.

3.4.2/ Summary of Cost Analysis

Snow Fencing

In summary, the landowners have estimated compensation in a very broad range of $1.31 to $21.00/m. When the two very high estimates from the Chatham group are excluded, it is noted that the upper end of the range at $3.00 is only slightly lower than the Ministry of Transportation 1990/1991 cost at $3.22/m.

In attempting to arrive at the yearly compensation to be paid to the landowner, it is noted that the landowner would incur essentially the same cost items as MTO. The only significant difference is that the landowner would not have as far to travel to the site as the MTO maintenance crew. This, however, is considered to be a small proportion of the overall cost. There is also considered to be some efficiency inherent in the landowner carrying out the task, in that it could be scheduled with ongoing farming operations and at a time convenient to the landowner. MTO, on the other hand, may have to bypass some sites during the snow fence erection operations because the site may not be ready pending a farmer finishing up late fall tillage operations, for example. This means MTO has to return to that site to complete the task.

Having considered the foregoing items, it would appear that an initial yearly compensation amount should be in a range of $2.50 to $3.00/m of snow fence erected.

This is considered to be a reasonable amount to be paid to the landowner for labour and cost of equipment involved as well as to provide for storing and maintaining the snow fence. This amount would be increased yearly according to published inflation rates.

An amount within the above estimated range would be a cost saving to MTO, even considering the internal costs for inspection and control. Since no overhead costs are charged to the snow fence maintenance operations, there would be some additional cost savings, though these would be offset by the costs of executing agreements with landowners.

Standing Corn

At the landowner meetings, the amount of compensation for leaving corn in the field for snow control purposes was discussed. However, due to the general lack of interest for this method, no specific amount was suggested. The general opinion seemed to be that if there were locations where standing corn could be utilized, the compensation should be the value of the corn as though harvested, plus a nuisance and inconvenience factor. It was suggested this factor should be at least 50% of the value of the crop.

The draft landowners agreement in Appendix G of this report sets out a suggested method of payment for corn left standing for snow control purposes.

Living Snow Fence

This method of snow control received a varied response by the landowners and the compensation amount was not discussed in detail. Some landowners saw it as an advantageous method, with MTO being responsible for all planting activities. A suggestion was made that an annual land rental amount based on Ontario Ministry of Agriculture and Food Land Rental information could be paid to the landowner.

After researching and reviewing various agreements between property owners and governments together with living snow fence background literature (mostly from U.S. sources) a method of compensating the landowner has been suggested in the agreement in Appendix G of this report.

3.5/ MTO Staffing Implications

The study team also reviewed the implications that co-operative snow control agreements could have on MTO staff complements.

It was recognized that current snow fencing activities occur in a very short time period in both the spring and the fall. Although part-time help may be hired on some patrols for

snow fencing tasks are complete. Therefore, in an era of reductions in maintenance budgets, any labour freed up as a result of co-operative agreements would be put to maintenance tasks which would formerly have been deferred. It was also recognized by MTO staff that any change which eases the spring workload is desirable because winter snow removal staff contracts terminate on March 31. If snow fence removal is not complete by this date, permanent staff comes under pressure to remove fences before farmers begin tillage operations.

Based on the flexible approach to landowner involvement recommended by the study team (see Chapter 5), there is likely to be an extended transition period following any decision to implement co-operative management techniques. During this time, adjustments would be made to MTO staff responsibilities and activities. For example, if landowner involvement in fencing were to become popular, the patrol supervisor's inspection and landowner liaison time could increase, but his crew supervision time would decrease. If demand for snow hedging increases, some increases in related staff time could be anticipated; however, interested landowners would probably be spread over a large geographic area and so not burden staff in a local area. Such changes could be monitored during a trial period. Thus, no significant shifts in MTO staff allocation time are anticipated in the short term as a result of joint snow control ventures.

4/ Model Landowner Agreement for MTO Co-operative Snow Control Program

Following a review of the initial project findings, MTO and the study team agreed that steps should be taken to formulate a model landowner agreement for a co-operative snow control program. It was also the consensus that the agreement should clearly specify the roles and responsibilities of both the landowner and MTO under three co-operative scenarios - standard snow fencing, living snow fences and standing corn.

The model agreement appears in Appendix G. It is meant to serve as a basis for discussion within MTO, with the understanding that refinement will take place should MTO decide to implement it on a trial basis.

The basis for preparation of the model agreement was the analysis of the literature (Section 3.1.2) and other landowner agreements where available (Section 3.2), advice from landowners (Section 3.3) and the analysis of costs under co-operative ventures (Section 3.4.1 and 3.4.2). The assumptions supporting the contents of the model agreement are contained in these sections. The conclusions and recommendations (Chapter 5) provide additional support for statements contained in the model agreement.

5/ Conclusions and Recommendations

This chapter synthesizes the findings and analysis of the various study components into conclusions and recommendations which can be used to guide MTO's research and operations planning related to co-operative snow control ventures with landowners. The main project recommendations are presented first, followed by others relating directly to standard snow fencing, living snow hedges, standing corn and other considerations.

Main Project Conclusions

It became clear in the meetings that many different factors influence landowners' receptivity to possible joint snow control ventures with MTO. Such factors include landowner age (i.e. physical energy), on-farm labour availability, configuration of fields and watercourses relative to the roads, type of farm (livestock vs. cash crop), and their perception of the type of work involved. Consequently, in each of the three meetings, there was a range of interest expressed in the snow control options, with one or two participants in each area indicating strong interest in participating in one or more of the options.

Furthermore, in all three areas, study team members witnessed good rapport between patrol supervisors and the farmers in attendance, with farmers expressing a good deal of respect

for the way in which supervisors conduct snow fencing operations. It is also the study team's understanding that patrol supervisors have growing responsibility and autonomy in day-to-day decision-making about their operations.

> ***Recommendation #1** - that MTO build on the good rapport experienced at the farm level and on the growing patrol supervisor decision-making autonomy by offering the maximum possible flexibility in co-operative snow control measures to landowners. This includes presentation of the three options as noted in the agreement (Appendix G), flexibility in length of term of any of the options, as well as the option of MTO continuing to handle snow fencing activities for landowner property as they have in the past. It appears unrealistic to expect any one co-operative alternative to be universally accepted by landowners, and for that matter, by Ministry staff.*

Precedents for co-operative standard snow fencing ventures were not found through contacts with other jurisdictions and review of the literature. However, several active co-operative living snow fence programs in the U.S. midwest were identified, as were standing corn agreements from Iowa and Quebec (research only). In Ontario, there appear to be virtually no co-operative snow control venture precedents, with the exception of Wellington County, where a 50-year old lease agreement was obtained.

Landowners were hesitant to commit to what they considered fair compensation levels, for example, because comparative data or other reference points were lacking. Had additional supporting data from ongoing programs been available, landowners would have been in a much better position to assess their own level of interest in, and possible commitment to, joint ventures. Moreover, there appear to be sufficient economic and environmental advantages to warrant refinement of co-operative snow control initiatives through pilot projects.

> ***Recommendation #2** - that MTO establish up to three pilot projects in co-operative snow control, in geographically separate areas of Ontario for a minimum of two, and preferably three years. The primary focus would be on snow fencing as it would allow farmers to test the logistics of setting, dismantling and storing snow fence, and to evaluate the level of*

compensation being offered them. This length of pilot project should be adequate to develop data which would be helpful to other farmers considering this option. The same time period would also be helpful for patrol supervisors to review the dynamics of their own on-site time allocation (e.g. increased inspection and training time vs. decreased crew supervision time for carrying out snow fencing activities).

<u>Recommendation #3</u> - that for the pilot project time period, a compensation amount of $2.50 - $3.00/m (adjusted annually for inflation as per model landowner agreement) be offered to the landowners. Once MTO has determined a final rate, this rate must be applied universally in order to avoid compensation disputes between farmers. MTO should not try to accommodate, for example, differences in site locations that make it more or less difficult to set fences (e.g. stony ground).

<u>Recommendation #4</u> - wherever possible within the pilot project areas, landowners should be encouraged to establish living snow fences or leave rows of corn standing in support of economic and long-term environmental objectives. Although these are relatively new approaches to snow control in Ontario, there is evidence from the American literature and experience that the economic advantages of living snow fences are attractive when installation costs are spread over the expected lifespan of the hedge. MTO may be required to go beyond the immediate pilot project area in order to find willing hosts with the appropriate field configurations.

<u>Recommendation #5</u> - during the course of the pilot project time period, as procedures and data begin to show some consistent patterns, MTO should consider ways to actively promote co-operative snow control agreements with landowners. For example, media exposure could be given to landowners planting snow hedges on Arbour Day or Earth Day. Promotion of co-operative fencing could occur through county chapters of the Ontario Federation of Agriculture, Soils and Crops Improvement Associations or locally active environmental groups. Joint public education programs with Conservation Authorities and the Ministry of Natural Resources could also be considered.

Standard Snow Fencing

Farmers were consistently reluctant to commit to any capital outlay for fencing materials, or to be responsible for replacing material that could be damaged during prescribed uses. It was also recognized that MTO may obtain volume purchasing price discounts.

> ***Recommendation #6** - that MTO continue to purchase materials and replace materials damaged under the prescribed uses when the patrol supervisor visits the landowners to renew the respective agreement. Care of the materials on the part of the landowner will be encouraged by requiring that he replace any materials damaged during use for purposes beyond its prescribed use. Snow fence material must be covered within the owner's existing fire insurance policy or any policy covering events outside the control of the owner.*

Participants at landowner meetings adamantly refused to accept the burden of any third part liability should an accident be traced somehow to improper setting of snow fence.

> ***Recommendation #7** - because MTO would maintain its inspection and supervision role under any co-operative arrangement, it is recommended that MTO would continue to accept any third part liability. Access by MTO personnel to the fencing area would continue to be required for inspection of the installations.*

Living Snow Fence

During the course of the study, it became clear that most farmers are reluctant to remove agricultural land from production for snow hedges, particularly where the hedge would run perpendicular to the current working direction of the field and where tree roots might interfere with subsurface tile drains. Based on communication with MTO staff, it is also evident that there is considerable flexibility on the distance a hedge can be placed from the road and still serve a snow control function.

> ***Recommendation #8** - that MTO be prepared to review with interested landowners, the suitability of specific sites for the establishment of snow hedges. On most properties, the hedge will need to be established along*

existing field boundaries, watercourses or other natural or physical boundaries which will not necessarily parallel the road in question. The technical specifications for maintaining snow hedge effectiveness at varying distances and angles to the road will need to be reviewed on a case-by-case basis.

The draft landowner agreement was designed as a two-part agreement between the landowner and MTO. However, other agencies or organizations may be willing to contribute human, technical or financial resources to tree planting efforts.

Recommendation #9 - if MTO experiences a positive response from landowners to the concept of snow hedging, cost and other resource-sharing ventures should be considered with appropriate agencies and organizations. For example, Conservation Authorities (CA) could be approached about their willingness to provide technical and equipment resources to shelterbelt or hedge plantings which meet CA and MTO objectives.

Standing Corn

The feasibility of landowners leaving rows of corn standing as a snow control measure is limited to fields configured properly to the roads, to soils not requiring fall plowing (e.g. loamy soils) and to farms where the operator accepts the resulting appearance of the fields. As with snow hedges, there are few Canadian precedents to review to judge their effectiveness and landowner acceptability.

Recommendation #10 - that MTO monitor the ongoing standing corn research in Quebec, obtain further details on the informal working arrangements that Wellington County road foremen have developed in prior years with selected farmers, and consider initiating some similar snow control effectiveness research in Ontario, pending outcomes from the Quebec research.

Other

Based on the nature of the landowner agreement proposed in this study, there would not appear to be an immediate need to modify legislation under the Public Transportation and

Highway Improvement Act. MTO would still need to have authority to enter the landowner's property to inspect the fencing, even if they are no longer needed to "erect and maintain" the fencing (Section 30(8)). By virtue of a signed agreement with the landowner, it is assumed that the landowner would have "lawful authority" to participate in fencing activities as provided for in Section 30(9). The legislation does not currently give significant incentive for planting trees on lands adjoining the "King's Highway" (75 cents per tree under Section 30(4)).

> ***Recommendation #11*** *- that following the results of the pilot project proposed in Recommendation #2, MTO consider refinement of wording in the Public Transportation and Highway Improvement Act as follows:*
>
> - *include the word "inspect" in Section 30(8)*
> - *rephrase Section 30(9) in positive terms, giving the landowner lawful authority to conduct fencing activities under the provisions of the landowner agreement*
> - *increase payment per tree for landowners planting trees on MTO-designated sites (Section 30(4)).*

To date, it appears that little discussion has occurred within MTO between the Research and Development Branch, the Maintenance Office, the Regions and Districts about the possibility of future landowner involvement in co-operative snow control activities.

> ***Recommendation #12*** *- that, should MTO approve the establishment of pilot projects, MTO District offices and their patrols be made aware of the results of this study and the endorsement of pilot projects. This will serve to stimulate discussion about the economic, environmental and operational acceptability of co-operative venture options, even as the options are field tested.*

No significant change would be required to MTO staff complements if co-operative snow control activities are put in place. The patrol crews would be relieved of some snow fencing

duties, but it is understood that within each patrol there are adequate tasks to offset the time saving. The patrol supervisor would spend less time supervising snow fencing crews, but would still be responsible for completing landowner agreements and monitoring the activities as per any agreement completed.

<u>Recommendation #13</u> - that MTO not consider any reduction or increase in the number of staff employed as a result of any co-operative snow control agreements.

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APPENDIX A
Snow Fencing Legislation

ISBN 0-7729-6

Government
of Ontario

Public Transportation and Highway Improvement Act

Revised Statutes of Ontario, 1980
Chapter 421

as amended by
1981, Chapter 68; 1983, Chapter 8, s. 19
and 1988, Chapter 24

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Removal of highway from jurisdiction and control of Ministry

(6) Where, in territory without municipal organization, an alternative route has been provided for the King's Highway or any other highway under the jurisdiction and control of the Ministry, or where for any other reason it is considered advisable that the highway or any part thereof should no longer be under the jurisdiction and control of the Ministry, the Lieutenant Governor in Council may direct that any part of the King's Highway or any part of any other highway under the jurisdiction and control of the Ministry, be no longer under the jurisdiction and control of the Ministry and the Crown shall not be liable for any damages caused by default in maintenance of the highway or for any damage sustained by any person using the highway on and after the day named by the Lieutenant Governor in Council.

Revocation of designation as King's Highway

(7) Where a highway is closed for an indeterminate period, transferred to a municipality or removed from the jurisdiction and control of the Ministry under this section, any designation of the highway as the King's Highway is thereby revoked. R.S.O. 1980, c. 421, s. 29.

Planting trees

30.—(1) The Ministry may plant trees upon the King's Highway and the cost thereof shall be part of the cost of its maintenance.

Cutting, etc.

(2) No person, including a municipality and a local board thereof, shall injure, destroy, cut or prune any tree within the limits of the King's Highway without first obtaining the consent in writing of the Minister or a person authorized by him.

Offence

(3) Every person who contravenes subsection (2) is guilty of an offence and on conviction is liable to a fine of not less than $10 per tree and not more than $100 per tree and is also liable for any damage occasioned by the injuring, destroying, cutting or pruning.

Bonus for planting trees

(4) The Ministry may pay an amount not exceeding 75 cents for each elm, maple or other tree of a species approved by the Ministry planted on land adjoining the King's Highway in accordance with the conditions of a permit issued therefor by the Minister.

Bonus chargeable

(5) The amounts paid under subsection (4) are chargeable to the moneys appropriated therefor by the Legislature and are payable upon a certificate of an engineer of the Ministry giving the name of the person entitled, the number of trees of each species planted and the amount to which the person is entitled and certifying that the trees have been planted for a period of three years and that they are alive, healthy and of

good form and were planted in accordance with the conditions of the permit granted therefor by the Minister.

Agreements re fences

(6) The Minister may agree with the owner of property adjoining the King's Highway with respect to the moving, removal or construction of a wire or other type of fence along the King's Highway and may pay the owner therefor.

Removal of obstructions

(7) Subject to the payment of such compensation as is agreed upon or as is determined in the manner provided by section 14, the Minister may direct the owner of any tree, shrub, bush, hedge, fence, signboard, gasoline pump, building or other object growing or standing on lands adjacent to the King's Highway to remove it where in his opinion the safety or convenience of the travelling public so requires or where in his opinion it might cause the drifting or accumulation of snow or be injurious to the highway.

Snow fences

(8) The Minister or any person authorized by him may enter upon any land adjacent to the King's Highway without the consent of the owner and may erect and maintain snow fences thereon subject to payment for such damage as is suffered by the owner of the land so entered upon, and the amount thereof, if not agreed upon, shall be determined in the manner provided by section 14.

Offence

(9) Any person who hinders or interferes with the erection of snow fences under subsection (8), or who, without lawful authority, takes down, removes or otherwise interferes with snow fences that have been erected under that subsection, is guilty of an offence and on conviction is liable to a fine of not less than $10 and not more than $50. R.S.O. 1980, c. 421, s. 30.

Interference with King's Highway

31.—(1) Notwithstanding anything in any general or special Act, no person, including a municipality and a local board thereof,

(a) shall obstruct or deposit material on or take up or in any way interfere with the King's Highway; or

(b) shall construct or change the use of any private road, entranceway, gate or other structure or facility as a means of access to the King's Highway, other than a controlled-access highway,

except in accordance with the conditions of a permit issued therefor by the Minister. R.S.O. 1980, c. 421, s. 31 (1); 1988, c. 24, s. 4.

SNOW ROADS AND FENCES ACT
R.S.O. 1980, Chap. 477

Amended 1989, c. 72, s. 70; proclaimed in force March 31, 1990

Administered by the Ministry of Municipal Affairs

Section 7
Amended 1989, c. 72, s. 70(1) by striking out "and on conviction is liable to a fine of not less than $1 and not more than $20" in the fifth and sixth lines.

Section 8
Amended 1989, c. 72, s. 70(2) by striking out "and on conviction is liable to a fine of not less than $1 and not more than $20" in the fourth and fifth lines.

Section 12
Subsec. (4) amended 1989, c. 72, s. 70(3) by striking out "and on conviction is liable to a fine of not less than $1 and not more than $50" in the fifth and sixth lines.

SOLICITORS ACT
R.S.O. 1980, Chap. 478

Amended 1983, c. 21; in force May 26, 1983
Amended 1984, c. 11, s. 214; proclaimed in force January 1, 1985

Administered by the Ministry of the Attorney General

For cases 1930 to 1980 under generally and ss. 2, 3, 4, 5, 8, 9, 13, 16, 18, 19, 25, 26, 27 and 35 see *Ontario Statute Annotations*. R.S.O. 1980 edition.

Section 1
Subsec. (1) *R. v. Lawrie Pointts Ltd.* (1987), 59 O.R. (2d) 161, 32 C.C.C. (3d) 549 (C.A.), affg 58 O.R. (2d) 535, 29 C.C.C. (3d) 160 (Dist. Ct.).

This section is merely ancillary to s. 50(1) of the Law Society Act (Ont.) and does not prohibit unauthorized practice itself. The penalties provided by this section can only apply to unauthorized practice as defined by s. 50(1) of the Law Society Act and as a result do not extend to agents whose activities are excepted as being "otherwise provided by law".

Section 2
Subsec. (1) *Dyer v. Shanly et al.* (1982), 35 O.R. (2d) 697 (Co. Ct.).

Solicitor could not bring action on account issued on invoice form, bearing his name in print, but being otherwise unsigned and not being accompanied by a letter signed by the plaintiff.

CHAPTER 477

Snow Roads and Fences Act

PART I

SNOW ROADS

Interpretation

1. In this Act, "vehicle" means a vehicle drawn by one or more horses or other animals or propelled by any motive power. R.S.O. 1970, c. 440, s. 1.

Powers of county council

2. The council of a county may provide, by by-law, for the making of a double track during the season of sleighing in each and every year upon such leading highways within the county, whether or not county roads, as the council considers advisable. R.S.O. 1970, c. 440, s. 2.

Nature of tracks

3. Where a county council has passed such a by-law, the double track shall be so made that one vehicle may pass another without being obliged to turn out when meeting. R.S.O. 1970, c. 440, s. 3.

Right of road

4. Every vehicle shall travel in the right-hand track, and any person driving or propelling his vehicle in the wrong track shall leave it when he meets a vehicle entitled to use such track. R.S.O. 1970, c. 440, s. 4.

Duties and powers of pathmasters or roadmasters

5.—(1) A county council may also provide by by-law that pathmasters appointed by township councils shall cause the highways on which double tracks are to be made to be kept open for travel within their respective municipalities, or, if there are no such pathmasters available, may appoint roadmasters to perform that duty.

Calling out persons liable to perform statute labour

(2) Such pathmasters or roadmasters have power to call out persons liable to perform statute labour to assist in keeping open such highways within their respective municipalities, and may give to the persons employed in so doing certificates of having performed statute labour to the amount of the days work done, and such work shall be allowed for in the next season's statute labour.

Application of commutation of statute labour

(3) The county council may also provide for the application by the township councils of so much of the commutation of statute labour fund as may be necessary for

the keeping open of such highways within their respective municipalities. R.S.O. 1970, c. 440, s. 5.

County acting on default by township

6. If a township council neglects or refuses to keep such highways open for travel as provided by section 5, the county council may do so, and may impose upon the township so in default a rate sufficient for that purpose, and the rate shall be levied and collected in the manner provided by the *Municipal Act* for the collection of county rates. R.S.O. 1970, c. 440, s. 6.

R.S.O. 1980, c. 302

Offence for persons refusing to work

7. Any person liable to perform statute labour who refuses or neglects to turn out and work under any pathmaster or roadmaster who calls him out for that purpose, under the authority of this Act, is guilty of an offence and on conviction is liable to a fine of not less than $1 and not more than $20. R.S.O. 1970, c. 440, s. 7.

Offence for refusing to turn out of wrong track

8. Any person travelling with his vehicle in the wrong track and refusing or neglecting to leave the track when met by a person who is rightfully travelling therein with his vehicle is guilty of an offence and on conviction is liable to a fine of not less than $1 and not more than $20. R.S.O. 1970, c. 440, s. 8.

How Act enforceable in townships in districts

9. All the rights and powers conferred by this Act upon councils of counties may be exercised by the councils of townships in districts without county organization. R.S.O. 1970, c. 440, s. 9.

PART II

SNOW FENCES

Powers of councils to require removal of fences

10.—(1) The council of any municipality may pass by-laws requiring the owners or occupants of land bordering upon a public highway to take down, alter or remove any fence that causes an accumulation of snow or drift so as to impede or obstruct travel.

Making compensation therefor

(2) The council shall make such compensation to the owners or occupants for the taking down, alteration or removal of the fence and for the construction in lieu thereof of some other description of fence, approved of by the council, as may be mutually agreed upon, and in default of agreement the compensation shall be determined by arbitration, and three fence-viewers appointed by the council shall be the arbitrators. R.S.O. 1970, c. 440, s. 10.

Power in case of neglect or refusal by owner or occupant

11.—(1) If the owner or occupant refuses or neglects to take down, alter or remove the fence as required by the council, the council, after the expiration of two months from the time the compensation has been agreed upon or determined by arbitration, may take down, alter or remove the fence, and may construct the fence that has been approved of by the council, and the amount of all costs and charges thereby incurred by the council, over and above the amount of compensation, may be recovered from the owner or occupant by action in any small claims court having jurisdiction in the locality, and the amount of the judgment, if not sooner paid, shall be placed by the clerk of the municipality upon the collector's roll against the land upon or along the boundaries of which the fence is situate, and shall be collected as other taxes.

Right of occupant to deduct amount paid from rent

(2) Where an occupant, other than the owner, is required to pay such sum, or any part thereof, he may deduct it, and any costs paid by him, from the rent payable by him, or may otherwise recover it unless he has agreed with the landlord to pay it.

Duties of arbitrators

(3) The arbitrators shall examine the premises and shall, if required, hear evidence.

Fees

(4) The arbitrators are entitled to $2 a day, which shall be paid by the corporation of the municipality if the amount of the award exceeds the amount offered by the corporation, otherwise by the owner or occupant.

Appeal

(5) The award shall be filed in the office of the clerk of the municipality, and an appeal lies therefrom to the judge of the county or district court of the county or district.

R.S.O. 1980, c. 242 to apply

(6) The provisions of the *Line Fences Act* apply with necessary modifications to the appeal. R.S.O. 1970, c. 440, s. 11.

Power to enter on lands

12.—(1) Every such council may, on or after the 15th day of November and before the 31st day of March following, enter into and upon any lands of Her Majesty, or of any corporation or person, situate within the municipality and lying along any public highway in or adjoining any such municipality, and may erect and maintain snow fences thereon, subject to the payment of such damages, if any, as may be suffered by the owner or occupant of the land so entered upon, the amount thereof to be ascertained, if not mutually agreed upon, by arbitration as provided in section 10.

Removal

(2) The snow fences so erected shall be removed on or before the 1st day of April following.

Extension of time for maintenance and removal

(3) When weather conditions do not permit the removal of snow fences on or before the 1st day of April, the council may by by-law extend the time during which snow fences may be maintained and the date by which they shall be removed to a date fixed by the by-law.

Offence

(4) Any person who hinders or interferes with the erection of snow fences under the provisions of this Act, or who takes down, removes or otherwise interferes with snow fences that have been erected hereunder is guilty of an offence and on conviction is liable to a fine of not less than $1 and not more than $50. R.S.O. 1970, c. 440, s. 12.

APPENDIX B
Contact List

MAILBACK SURVEY RESPONDENTS

Canada

Mr. A.L. George, Maintenance Engineer
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P.E.I. Department of Public Works
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Mr. Pierre Vaillancourt, Service de l'entretien d'hiver
Ministere des transports du Quebec
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Mr. J.B. Rowley, Division of Maintenance
Manitoba Department of Highways and Transportation
215 Garry Street
Winnipeg, Man. R3C 3Z1

Mr. B.D. Martin, Director, Maintenance Branch
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Wyoming Highway Department
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Mr. Bob Kuenzl, Oregon Department of Transportation
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Salem, Oregon 97310

COUNTY/REGIONAL MUNICIPALITY ROAD ENGINEER CONTACTS*

County/Municipality	Contact
Brant	Mr. C. Spencer, Engineer
Bruce	Mr. Brian Knox, Engineer
Dufferin	Mr. S.E. Smart, Engineer
Elgin	Mr. Fred Grock, Engineer
Essex	Mr. Harry Kempster, Maintenance Yard Foreman
Lambton	Mr. Steve Pasquin, Road Superintendent
Oxford	Mr. D. Pratt
Perth	Mr. T. Collings, Engineer
Simcoe	Mr. Taylor, Engineer
Waterloo	Mr. Brian Soehner, Engineering Approvals Supervisor
Wellington	Mr. Al Holmes, Paul Johnson, Engineers

* Telephone contact during November 1991.

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APPENDIX C
Maintenance Operating Instructions

Ministry of Transportation and Communications
Ontario

MAINTENANCE OPERATING INSTRUCTION
M-700-A
SNOW FENCES AND HEDGES

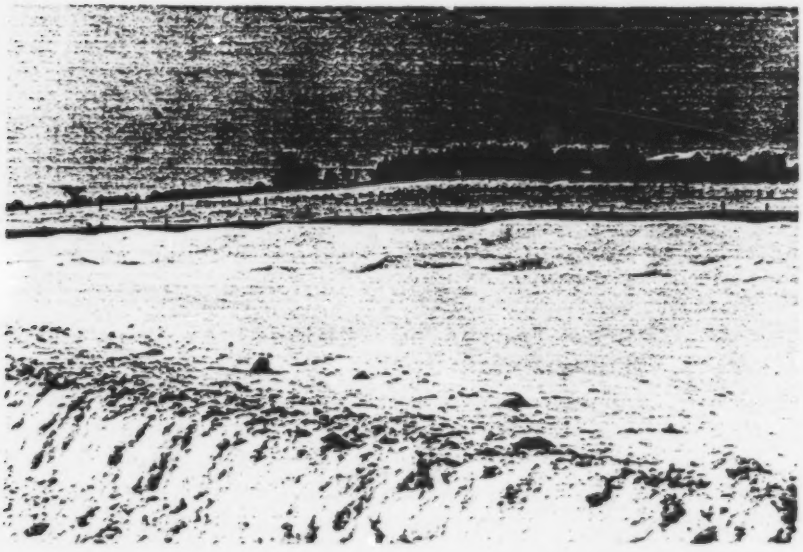
APPROVED

Director, Highway Operations Branch

The most common snow control devices currently used by the Ministry consist of Snow Fences and Hedges.

Snow Fences are normally constructed of wood slats joined with wire, with 50% closed sections.

Snow Hedges are usually close planted coniferous trees or dense growing deciduous shrubs.



The purpose of this Maintenance Operating Instruction is to describe the use of Snow Fences and Hedges for the control of drifting or blowing snow.

Date Received _____ Read and Noted By _____ Title _____

REVISED 1981

POLICY

Snow fence can be erected on private property under authority of Section 27 (8) of the Public Transportation and Highway Improvement Act.

THEORY

Snow drifting on the highway depends on many factors, such as the topography of the countryside, the geometrics of the road, obstructions such as trees close to the road, weather conditions and the manner in which plowed snow is stored.

It is likely that the wind accompanying or following a snow fall will cause more drifting than the snow fall itself. During the winter months, winds normally come from the prevailing wind direction about 60-80% of the time. Snow begins to move when the wind speed reaches about 10 km/h and increasing amounts of snow are picked up and moved as the wind speed increases. The snow is carried smoothly just above the surface (within 1 m) until it reaches an obstruction, such as a tree or rising ground. The resulting turbulence and slower wind speeds on the lee side of the obstruction allows the snow to settle out and form drifts. "White-outs" may occur when turbulence is created as the wind and snow move over the top of and around an obstruction (trees) immediately adjacent to the roadway.

Snow fences and hedges can be used to induce turbulence, causing snow to drift at selected locations away from the roadway.

Under normal conditions snow control procedures are helpful in controlling both the formation of snow drifts on the roadway, and the loss of visibility (white-outs) caused by blowing snow.

It is recommended that snow fence and snow hedge be used to control abnormal and intense drifting conditions only.

ERECTION OF SNOW FENCE

Snow fence should be erected by November 1 in Northern Districts and by December 1 in Southern Districts.

When erecting snow fence on private property, always contact the property owner each year before entering upon his property. If difficulties are encountered with the property owner, contact the District Maintenance Office.

The following procedures with regard to snow fence are to be carried out prior to the winter season:

1. The location of a snow fence is dependent upon two factors - the minimum distance from the edge of the shoulder of the road; and the minimum distance from the Right-of-Way fence.

   The following distances should be used when placing snow fence.

Height of Fence	Min. Distance from Edge of Shoulder	Min. Distance from ROW Fence
1.2 m	40 m	25 m
1.8 m	50 m	35 m
2.4 m	60 m	45 m

2. Snow fence should be erected with a 2 cm gap between the ground and the bottom of the fence.

3. Snow fence is most effective when placed at right angles to the prevailing wind; however, since the wind direction varies, it is normally placed parallel to the road, on the same side as the prevailing wind.

4. Where extensive drifting occurs, and single snow fences have been filled with snow in previous years, additional storage of snow may be accommodated by:

   (a) placing additional parallel rows of snow fence behind the first fence;

   (b) utilizing a greater height of snow fence, i.e. 1.8 m or 2.4 m (stacked 1.2 m fence above 1.2 m fence).

5. Snow fence should be attached to the windward side of the posts to provide maximum stability of the installation.

6. Snow fence posts are to be erected at a maximum of 5 m apart, in a straight line. Posts should be driven 0.6 m into the ground.

7. Posts should be braced with guy wires and steel posts at the ends and at 35 m intervals. On sharpe curves and steep hills consideration should be given to placing line braces every 20 m.

8. Fence should be stretched tight enough to prevent excessive sag.

9. Snow fence is to be fastened to each post with a minimum of 3 tie wires.

10. Spaces greater than 1.5 m between groups of coniferous trees or other obstructions, (buildings, etc.), at which excessive drifting problems occur, should be eliminated with the use of snow fence.

    Consideration should be given to eliminating the need for snow fence by planting trees at these locations.

11. Snow fence is not normally required for cut sections if the side slopes are flatter than 4:1.

    Serious consideration should be given to flattening slopes to eliminate or reduce drifting in cuts where drifting is a problem.

REMOVAL OF SNOW FENCE

1. Snow fence should <u>not</u> be removed earlier than:

    March 22 - in Districts 1, 2
    March 31 - in Districts 3, 4, 6, 7, 8
    April 7 - in Districts 5, 9, 10, 11
    April 15 - in Districts 13, 17
    April 22 - in Districts 14, 18
    April 30 - in Districts 19, 20
    May 7 - in District 16

    Snow fence may be removed earlier when the specific approval of the District Engineer has been given and, where applicable, a written request from the farmer for earlier removal has been received.

2. When removing snow fence all wire ties should be collected.

PLACEMENT OF SNOW HEDGES

The following principles and procedures are to be followed when considering the planting of snow hedges:

1. Based on model studies, it would be preferable that snow hedges be located a distance of 15 times the eventual maximum height (*H*) of the hedge from the edge of shoulder. However, in most instances, this is not practical, for this distance would exceed our existing right-of-way width. Therefore, as a general principle, snow hedge should be located as far back from the edge of shoulder as possible to maximum distance of 15 x (*H*).

   Locations,where snow hedge is not working,or is creating additional drifting problems or white-outs, should be reported to the District Maintenance Office. Consideration should then be given to removing this snow hedge and replacing it with an alternative method for controlling drifting, such as the use of snow fence, flattening slopes or planting a lower snow hedge.

   Note: The distance of 15 x H achieved from the study is based on a wind direction approaching at right angles to the snow hedge. If winds are approaching at angles less than 90°, a shorter distance from the edge of shoulder can be tolerated proportionately.

2. Snow hedges should be placed parallel to and on the windward side of the road.

MAINTENANCE OF SNOW HEDGES

All snow hedges should be maintained in accordance with Maintenance Quality Standard M-300-4, Maintenance of Roadside Plantings.

Ministry of Transportation and Communications
Ontario

APPROVED
Director, Maintenance Branch

MAINTENANCE QUALITY STANDARD

M-300-4
MAINTENANCE OF ROADSIDE PLANTINGS

Tree and shrub plantings, and natural growth areas within the highway right-of-way have been an accepted policy of the Ministry for many years. Essential to the survival of this plant material is a planned maintenance program. The maintenance program is applied in:

(a) newly-planted areas;
(b) established plantings;
(c) natural growth areas.

A high degree of maintenance is essential for plant material to survive and to ensure that the objectives of a safe, economical and aesthetic roadside are achieved.

Date Received _____ Read and Noted By _____ Title _____

RESPONSIBILITY:

It is the responsibility of the District Landscape Supervisor or Foreman to inspect the roadside plantings annually in order to prepare a program of maintenance. This inspection should be done with the Patrolman and/or Patrol Supervisor.

This program is to be carried out by District Landscape personnel, assisted, when necessary, by patrol forces.

MAINTENANCE REQUIREMENTS:

Maintenance requirements set out in this Standard are separated on the basis of the seasonal needs of plant material.

SPRING

1. All tree and shrub plantings shall be fertilized as required for a minimum period of 3 years after planting. Plant material should be fertilized with an approved granular fertilizer from March 1st to July 1st. As fertilizing stimulates new growth, the cut-off date enables this tender new growth to mature prior to the winter season.

2. All trees or shrubs showing evidence of heaving from frost shall be replanted at the proper depth.

3. Tree damage caused by animals or winter elements shall be repaired.

SUMMER

1. Tree and shrub plantings, regardless of size, shall be watered as required for a minimum period of three years after planting. Watering shall be carried out when the soil commences to dry out, usually during the months of June, July and August.

2. Approved mulches around the trees and shrubs shall be added, as required, to bring mulch up to the original depth.

SUMMER (Cont'd)

3. Trees shall be checked to ensure they are vertical and stable. Tree stakes are to be checked to ensure that the tree is being supported in a vertical position. Damaged or misaligned stakes are to be replaced as required. Guys and turnbuckles, supporting large trees, are to be adjusted as required.

4. Weed and grass control shall be carried out with the approved pesticide to eliminate unwanted competitive growth.

5. Routine pruning of trees and shrubs will be performed to improve appearance, shape and well being of the plants.

   It should be noted that this work is not to be undertaken by Patrol Staff without the supervision of the Landscape Supervisor or Foreman. Patrol staff, however, should take appropriate action where trimming or pruning is deemed necessary to avoid a situation hazardous to the public.

6. Plantings, which are being attacked by insects or show signs of disease, shall be treated immediately with the appropriate pesticide. Treatment may be required at any time during the growing season depending on the life cycle of the insect or disease.

   Situations of infestation by disease or insect, noted during routine road patrol, are to be reported to the District Maintenance Office. (See also Maintenance Quality Standard M-395, Road Patrol).

7. Marking of dead trees for future removal will be done by the District Landscape Supervisor or Foreman in conjunction with the patrolmen.

FALL

1. To eliminate mouse and rabbit damage during the winter months, trees and shrubs shall be treated with a rodent repellant or protected with tree guards.

2. Staking and guying should be inspected and adjusted, as required, to ensure the stability of the tree during the winter months.

3. Watering of evergreen trees is to be carried out, if required, to ensure adequate moisture. Evergreens in urban areas are to be sprayed with 'anti-desicant' materials to reduce possible damage from winter salt spray.

FALL AND WINTER

1. Trees, which have been previously marked by the District Landscape Supervisor, shall be removed.

   Trees, which constitute an immediate hazard, will be scheduled for early removal regardless of the season.

   Stumps will normally be 'close cut' during tree removal operations, except where the stump presents a hazard to the public. In these situations, the stump will be removed.

2. The pruning of large trees may be carried out during the winter dormant period and prior to the beginning of sap flow in the spring.

3. Plantings should be inspected by Landscape Crew personnel periodically throughout the winter to check for rodent damage.

APPENDIX D
Examples of Landowner Agreements - Co-operative Living Snow Fence Programs

GRAND RIVER CONSERVATION AUTHORITY
REFORESTATION PLANTING PROJECTS ON PRIVATE LAND

Form #284

GRAND RIVER CONSERVATION AUTHORITY
CONSERVATION SERVICES PROGRAM
REFORESTATION PLANTING PROJECTS ON PRIVATE LAND

The Grand River Conservation Authority will provide technical assistance and tree planting services to eligible private landowners interested in reforestation through the Authority's Conservation Services Program. Reforestation includes assistance in planting all seedling stock for woodlots, shelter belts, erosion control and wildlife management.
The following list provides details on the requirements of the program.

(1) Advisory services are free to anyone living or owning land within the watershed.

(2) The landowner must own 2 hectares (5 acres) of land exclusive of dwellings to be eligible.

(3) All plantings must be carried out at least 30 metres (100 feet) from any dwelling to be eligible except for shelter belts.

(4) The landowner must sign a 15 year agreement with the Authority to protect the planting site from livestock, fire, machinery, insects, wildlife and disease.

(5) The landowner must get written permission from the Authority to destroy a planting site. Should this permission not be obtained, the landowner will be invoiced by the Authority for the Authority cost of planting the trees at a rate equal to the average cost of planting in the previous year.

(6) An experienced tree planting crew will plant 2,000 seedlings or more for a nominal fee to be established annually. This service includes the picking up of the seedlings from the Ministry of Natural Resources Provincial Nurseries, but does not include the cost of the seedlings which must be paid to the Ministry of Natural Resources.

(7) A hand planting subsidy of $100.00 per 1,000 seedlings is available to landowners wishing to plant between 500 and 2,000 trees themselves. These hand planting sites must be inspected by the Authority staff before and after the planting takes place if the landowner wishes to qualify for the subsidy.

(8) The Authority takes no responsibility for the failure of a tree or trees to become established, but will take the utmost care to see that the seedlings are properly cared for while in their possession, and that the planting is done properly.

(9) The Authority will determine the best time and method of all plantings and has the right to reject applications where seedlings are being planted off site and unlikely to survive.

(10) The landowner will allow Authority personnel permission to inspect these plantings periodically during the years subsequent to the planting.

(11) The Authority recommends a soil sterilent herbicide be sprayed around the trees at the time of planting. The Authority will apply the herbicide at the time of planting unless the landowner requests in writing that they do not want the herbicide applied. The Authority will not accept responsibility for damages caused by the herbicide, but will take the utmost care to see that it is handled properly.

GRAND RIVER CONSERVATION AUTHORITY

CONSERVATION SERVICES PROGRAM

REFORESTATION PLANTING PROJECTS ON PRIVATE LAND

TO: Grand River Conservation Authority
400 Clyde Road, Box 729
Cambridge, Ontario N1R 5W6
Telephone 519-621-2761

Name: _____
Address: _____
_____
Postal Code: _____
Phone Res.: _____
Bus.: _____

Location of Planting Site
County: _____
Township: _____
Concession: _____
Lot (or part): _____
No. of Hectares: _____

Request trees to be planted Spring 19___
Soil sterilent requested YES ___ NO ___

SPECIES ORDERED	SPECIES RECEIVED

Planting Plan Drawn By _____

I, the landowner agree with the Grand River Conservation Authority to the following terms:

(1) To protect the planting at all times for a 15 year period (beginning on the date of planting) from all destructive agents (eg. fire, livestock, insects, disease, machinery), as can be reasonably expected.

(2) To pay the nominal fee for planting services to the Conservation Authority within 30 days of being invoiced, and to pay Ontario Ministry of Natural Resources for the nursery stock.

(3) To pay back the cost of planting the trees to the Conservation Authority should I destroy the planted trees by any means, at a rate equal to the average cost of planting during the previous year.

(4) To allow Authority employees permission to enter my property any time during the 15 year period to inspect the plantings.

LANDOWNER'S SIGNATURE _____

DATE _____

AUTHORITY SIGNING OFFICER _____

Pursuant to section 29(2) of the Municipal Freedom of Information and Protection of Individual Privacy Act, 1989, the personal information contained on this form is collected under the legal authority of the Conservation Authorities Act., R.S.O. 1980, 085 as amended, and is used for the purposes of invoicing, record keeping, and follow-up communication. Where applicable, this information will be disclosed to the contractor responsible for implementing the project. Questions about this collection of personal information should be directed to the Forestry Technician, Land Management Division, Grand River Conservation Authority, 400 Clyde Road, Box 729, Cambridge, Ontario N1R 5W6

WELLINGTON COUNTY/LANDOWNER SNOW HEDGE LEASE AGREEMENT

SCHEDULE "A"

THIS INDENTURE made in duplicate the 15th day of November A.D. 1967

IN PURSUANCE OF THE SHORT FORMS OF LEASES ACT.

B E T W E E N:

BLACKBURN FARMS LIMITED, a Company incorporated under the laws of the Province of Ontario, hereinafter called the Lessor,

OF THE FIRST PART

and

THE CORPORATION OF THE COUNTY OF WELLINGTON, hereinafter called the Lessee,

OF THE SECOND PART

THIS INDENTURE WITNESSETH that in consideration of the rents, covenants and agreements hereinafter reserved and contained on the part of the lessee, the lessor doth demise and lease unto the lessee all that certain parcel or tract of land and premises situate lying and being in the Township of West Garafraxa in the County of Wellington and being composed of part of the northeast half of Lot 16 in the 4th concession of the Township of West Garafraxa in the County of Wellington more particularly described as follows: COMMENCING at the easterly angle of said half lot being at the intersection of the road allowance between the 4th and 5th concessions in the said Township of West Garafraxa with the road allowance between Lots 15 and 16 in the 4th concession of the said Township; THENCE northwesterly along the northeasterly limit of said half lot Seventy-five (75) feet to a point in the said limit; THENCE southwesterly and parallel with the southeasterly limit of said half lot to the limit between the east and west halves of said Lot 16; THENCE southeasterly along said last mentioned limit Seventy-five (75) feet to the southeasterly limit of said Lot 16; THENCE northeasterly along said last mentioned limit to the place of beginning containing by admeasurement Three and Seven Tenths (3.7) acres.

RESERVING HOWEVER to the lessor its successors and assigns a right-of-way for persons, animals and vehicles over, along and upon the strip of said land Twenty (20) feet in width in order to allow the lessor to have access to the road allowance between Lots 15 and 16 in the 4th concession of the said Township which said strip of land may be more particularly described as follows: COMMENCING at the southerly angle of the easterly half of Lot 16 in the 4th concession of the Township of West Garafraxa being the point where the boundary between the east and west halves of said Lot 16 intersects the northeasterly

limit of the road allowance between Lots 15 and 16 in the said concession; THENCE northeasterly along the southeasterly limit of said Lot 16 Twenty (20) feet to a point in the said limit; THENCE northwesterly and parallel to the northeasterly limit of said Lot 16 Seventy-five (75) feet to the northwesterly limit of the lands hereinbefore described; THENCE southwesterly along the said last mentioned limit Twenty (20) feet to the boundary between the east and west halves of said Lot 16; THENCE southeasterly along the said last mentioned limit Seventy-five (75) feet to the place of beginning.

TO HAVE AND TO HOLD the said demised premises for and during the term of twenty years from the 1st day of January 1948, yielding and paying therefor yearly during the said term unto the lessor the sum of Eighteen Dollars and Fifty Cents ($18.50) net in advance on the 15th day of December in each and every year during the said term, the first payment to be due and payable on the 15th day of December 1948.

THE SAID LESSEE covenants with the said lessor to pay rent.

PROVISO for re-entry by the said lessor on non-payment of rent or non-performance of covenants.

IT IS UNDERSTOOD AND AGREED that the lessee shall have the right to plant trees of such kinds and in such numbers as may be determined by the County Roads Committee of the Corporation of the County of Wellington on the lands hereby demised and that the lessee shall have the right during the term of this lease or any renewal thereof and notwithstanding the provision of any Act of the Legislature of the Province of Ontario to trim, prune or cut down and remove or dig up and remove any or all trees so planted as in the opinion of its County Road Superintendent may be necessary, and all trees so planted shall remain the property of the lessee during the term of this lease or any extension thereof.

IT IS FURTHER UNDERSTOOD AND AGREED that the lessee shall be responsible only for erecting but not for maintaining a fence on the side or the strip of land hereinbefore described furthest from the road allowance between Lots 15 and 16 in the said Township.

NOTWITHSTANDING the provisions of this lease it is understood and agreed that the lessor shall have the privilege of cultivating, planting crops and harvesting the same on such part of the lands hereby demised on which for the time being trees shall not have been planted by the lessee, but that the lessor will not permit cattle, sheep or other animals to enter on the demised premises.

THE LESSOR COVENANTS with the lessee that if the lessee duly and regularly pays said rent and performs all the covenants, provisos and agreements herein contained and on the part of the said lessee to be paid and performed the lessor will, upon the request and at the cost of the lessee three months previous to the expiration of the said term and every subsequent term of twenty years obtained under this provision grant to the lessee a renewal lease for a further term of twenty years at the same rent and such new lease shall contain all the covenants, provisos and agreements contained in the present lease including the covenant for renewal.

IF THE LESSEE SHALL NOT prepare and execute the lease for such further term of twenty years and tender it for execution by the lessor before the expiry of the then existing term, all right of the lessee to such renewal shall cease and be null and void and the lessors may enter into and take possession of the said premises in their first and former estate, discharged of all right and claim for renewal by the lessee.

IT IS FURTHER UNDERSTOOD AND AGREED that the lessor shall permit the servants, agents or workmen of the lessee to have access across the lands of the lessor at any time for the purpose of cultivating the demised premises, planting trees thereon and cultivating, protecting, pruning, cutting or removing the trees so planted.

THIS LEASE shall enure to the benefit of and be binding upon the parties hereto, their successors and assigns respectively.

IN WITNESS WHEREOF the parties hereto have hereunto affixed their respective corporate seals attested by the hands of their respective officers in that behalf duly authorized.

SIGNED, SEALED AND DELIVERED)
in the presence of)

BLACKBURN FARMS LIMITED

.....

.....

CORPORATION OF THE COUNTY OF WELLINGTON

.....
Warden

.....
Clerk

KANSAS INTERAGENCY LIVING SNOW FENCE PROGRAM

INTERAGENCY LIVING SNOWFENCE PROGRAM

COMMITTEE AGREEMENT

I support the Interagency Living Snowfence Program and agree to the responsibilities listed therein.

Raymond G. Arb — 10/26/89
State Forester, Kansas State Forestry Division — Date

Robert L. Meinen — 11/6/89
Secretary, Kansas Department of Wildlife & Parks — Date

Steven Davies — 11.14.89
Secretary, Kansas Department of Corrections — Date

James A. Habiger — 11/28/89
State Conservationist, Soil Conservation Service — Date

W. M. Lackey — 12-11-89
For Secretary, Kansas Department of Transportation — Date

Spencer Tomb — 12-14-89
President, Kansas Wildlife Federation — Date

George T. Sugaw — 12-26-89
President, Kansas County Engineers Association — Date

INTERAGENCY AGREEMENT
LIVING SNOWFENCE PROGRAM

10/25/89

Living snowfences are tree and shrub windbreaks planted in critical areas along the federal, state and county road systems to prevent closure due to drifting snow. In addition to controlling snow deposition, living snowfences provide important wildlife habitat and beautification of our Kansas landscape.

As part of the Kansas Wildlife Federation's Roadside Wildlife Habitat Program endorsed by Governor Hayden, an Interagency Living Snowfence Program Committee has formed to promote, plant and maintain living snowfences. Members of the Committee include: Kansas State Forestry Division, Kansas State University; Kansas Department of Wildlife and Parks; Kansas Department of Corrections; Soil Conservation Service; Kansas Department of Transportation; Kansas Wildlife Federation and the Kansas County Engineers Association.

All Committe members are charged with the overall responsibility of educating the public of the multiple-benefits of living snowfences plus those individual responsibilities listed below:

KANSAS STATE FORESTRY DIVISION (KSFD)

The KSFD agrees to:

- Initiate contact with private landowners to determine interest in providing land for living snowfences.
- Design planting plans with specifications for proper species selection, site preparations, planting procedures and after planting care.
- Provide assistance to tree planting crews.
- Monitor after planting care: i.e. weed control replanting and insect and disease problems.
- Develop a brochure on the Living Snowfence Program to promote the planting of living snowfences.
- Assist in developing interagency standards and specifications for living snowfence design.
- Provide 50% cost-sharing on trees and shrubs used in living snowfences established under the guidance of the Kansas Living Snowfence Program.

KANSAS DEPARTMENT OF WILDLIFE AND PARKS (KDW&P)

The KDW&P agrees to:

- Enroll landowners in Wildlife Habitat Improvement Program (WHIP) once contact with willing landowner and compliance is met under guidance of Kansas Living Snowfence Program. WHIP provides 50% cost-sharing for trees and shrubs and native grasses planted to improve wildlife habitat.

- Provide tree planting machines and limited labor for planting.

- Provide native grass seed to seed up to 7.5 acres, grass seeders where applicable and limited labor for seeding.

- Provide expertise and input as required or requested.

KANSAS DEPARTMENT OF CORRECTIONS (KDOC)

The KDOC agrees to:

- Provide inmate labor crews on an intermittent basis to plant trees and shrubs at approved locations within a 50 mile radius of a KDOC minimum security work facility or honor camp.

  The use of inmates for this purpose is authorized per KSA 75-52,116. Specific facilities from which inmate labor crews may be drawn include:

  Norton Correctional Facility (NCF) - Norton, KS
  Stockton Correctional Facility (SCF) - Stockton, KS
  Ellsworth Correctional Facility (ECF) - Ellsworth, KS
  Hutchinson Correctional Work Facility (HCWF) - Hutchinson, KS
  Toronto Honor Camp (THC) - Toronto, KS
  El Dorado Honor Camp (EHC) - El Dorado, KS
  Winfield Correctional Facility (WCF) - Winfield, KS
  Forbes Correctional Facility (FCF) - Topeka, KS
  Topeka Correctional Facility (TCF) - Topeka, KS

  While the KDOC endorses and agrees to participate in the program, the final decision to provide inmate labor for a particular project/location shall be submitted and processed in accordance with KDOC Internal Management Policy and Procedure (IMPP) 010-125. Work projects undertaken in conjunction with this program shall be regarded as Short Range Intermittent as defined by IMPP 010-125.

SOIL CONSERVATION SERVICE (SCS)

The SCS agrees to:

- Provide assistance in contacting landowners where living snowfences are needed based on determination by the Kansas Living Snowfence Committee.
- Assist in design and layout of living snowfences to incorporate multiple-benefit concept using interagency standards and specifications.
- Provide assistance in follow up on planted living snowfences to check on maintenance and replanting needs.
- Supply status reports to appropriate authority.

KANSAS DEPARTMENT OF TRANSPORTATION (KDOT)

The KDOT agrees to:

- Prepare a list of locations where living snowfences are needed.

  Living snowfence plantings will be located on private property through agreements secured by KSFD and KDW&P. Plantings may be on KDOT rights-of-way where feasible.

- Provide funding to purchase drip irrigation systems where water source is available and/or landscape fabric.
- Provide funding for purchase of fencing materials on private property to protect plantings from livestock where needed.

KANSAS WILDLIFE FEDERATION (KWF)

The KWF agrees to:

- Educate other agencies/organizations, interest groups and legislators of Program goals, needs, activities and accomplishments.
- Assist in overall Kansas Living Snowfence Program coordination.

KANSAS COUNTY ENGINEERS ASSOCIATION (KCEA)

The KCEA agrees to:

- Promote the use of living snowfences along county roads where drifting snow is a problem.

Because of the intermittent nature of living snowfence projects, it is essential that the requestion agency contact the facility director in writing a minimum of 30 days prior to the commencing date of the project. The letter requesting inmate labor must include a statement that the work to be performed will be performed for the requesting agency and not for any private individual on whose property the work might take place. Adherence to the 30 day advance notice requirement is necessary so that necessary adjustments to staff and inmate work schedules can be made and/or to allow sufficient time to train personnel of the requesting agency if facility personnel are not available to supervise the project.

As a cooperating agency in the Kansas Living Snowfence Program, the KDOC understands that most (if not all) project work will take place on privately owned property. While the use of inmate labor on private property is ordinarily prohibited, it is acceptable in this instance based upon the following:

1. Inmates assigned to Kansas Living Snowfence Program projects work for a public agency and not a private individual and, without an augmented labor force, the project could not be undertaken.

2. The primary beneficiary of the inmate labor is the general public which uses the adjacent roadway protected by the living snowfence.

3. The Kansas Living Snowfence Program will result in a savings of tax dollars used for clearing snow drifted roadways.

4. In addition to the general public, the Kansas Living Snowfence Program provides improved wildlife habitat; thus, projects undertaken under the Program help preserve the State's natural resources.

5. The private land owner pays nothing for the trees and shrubs; they are provided by a tax supported governmental agency.

While use of inmate labor has been determined permissible, inmate labor shall not be used on private property unless the property owner has been advised in advance and has given his/her informed consent.

- Identify critical areas where living snowfences would prevent road closure due to drifting snow.

- Work with County Commissioners in support of Living Snowfence Program.

SAMPLE WORKING AGREEMENT
FOR
LIVING SNOWFENCE TREE PLANTING

Landowner Agrees To:

1. Provide a strip of land 70 feet wide and 640 feet long as shown on the enclosed aerial photo.
2. Prepare the site by deep chiseling and disking.
3. Keep the planting intact for a minimum of 20 years.
4. Protect the planting from fire and livestock.

Kansas Department of Wildlife & Parks (KDWP) Agrees To:

1. Pay for one half of the cost of 120 American plum and 150 eastern redcedar seedlings.
2. Plant seedlings.
3. Install weed barrier fabric.
4. Pay for one half of the replacements for two years.

Kansas State Forestry Division (KSFD) Agrees To:

1. Pay for one half of the cost of 120 American plum and 150 eastern redcedar seedlings.
2. Help plant seedlings.
3. Make two follow-up visits to the site per year for three years.
4. Help install weed barrier.
5. Pay for one half of the replacements for two years.

Kansas Department of Transportation (KDOT) Agrees To:

1. Purchase 1800 feet of weed barrier fabric.
2. Provide sign for planting.

LANDOWNER _____ DATE_____

KDWP _____ DATE_____

KSFD _____ DATE_____

KDOT _____ DATE_____

Living Snowfence Planting Plan

Landowner _____ Address _____

_____

Phone _____

County _____ Sec. _____ Twp. _____ Rge. _____

Soil Map Unit and Name _____

Present Ground Cover _____

Site Preparation Needed _____

_____

_____

Method of Planting: Machine _____ Hand _____ Date _____

Weed Control

Between Rows _____

Within Row _____

Fencing _____

_____

Additional Practices _____

_____

_____

_____

_____

_____

Planned By _____

Date _____

Planted By _____

Date _____

cc: District Forester, District Wildlife Biologist

Checklist for Living Snowfence

Landowner _____ Address _____

_____

_____

Phone _____

County _____ Sec. _____ Twp. _____ Rge. _____

	OWNER	KSFD	KDW&P	KDOC	SCS	KDOT				
Prepare Planting Plan										
Site Preparation										
Planting Material										
Planting of Trees and Shrubs										
Mechanical Weed Control										
Herbicide										
Herbicide Application										
Landscape Fabric										
Landscape Fabric Installation										
Drip Irrigation System										
Drip System Installation										
Drip System Operation										
Livestock Fencing Material										
Fence Construction and Maintenance										
Rabbit Protection										
Follow-up Inspections										
Replanting Trees and Shrubs										
Native Grass Seed										
Sowing Native Grass										

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION
LIVING SNOW FENCE HIGHWAY USE EASEMENT

LIVING SNOW FENCE HIGHWAY USE EASEMENT

This Agreement is made and entered into this_____day of _____, 19____, by and between_____, whose post office address is_____, hereinafter referred to as the LANDOWNER, and the State of South Dakota by and through its Department of Transportation, 700 Broadway Avenue East, Pierre, South Dakota, hereinafter referred to as the STATE.

1. PURPOSE

The STATE, for the purpose of reducing highway maintenance costs, providing greater service to the traveling public and promoting conservation, desires to enter into an agreement for a Highway Use Easement with private landowners for the planting and maintaining of living snow fences consisting of trees, bushes and shrubs as may be appropriate for the soil type and location. The LANDOWNER, possessing the necessary suitable land, shares these concerns and is willing to enter into an agreement for a Highway Use Easement as further defined in this document for these purposes.

2. HIGHWAY USE EASEMENT

The LANDOWNER hereby grants a Highway Use Easement to the STATE and the STATE, in turn, agrees to purchase a Highway Use Easement from the LANDOWNER for the real property as shown on EXHIBIT A, located in the _____ of section _____, township _____, range _____ and containing _____acres, more or less.

3. TERM OF HIGHWAY USE EASEMENT

Said Highway Use Easement shall be granted for a term of ten (10) years from the date this Highway Use Easement is approved by the Secretary of the

Department of Transportation. The STATE shall have the exclusive option to renew the Highway Use Easement for an additional period of ten (10) years.

4. CONSIDERATION

In addition to the mutual benefits to be derived from this Highway Use Easement, the STATE agrees to pay the LANDOWNER a payment of _____ for this easement. This payment shall be in addition to any fees payable under paragraphs 5, 6 and 7.

5. SITE PREPARATION

The LANDOWNER shall prepare the site for planting of trees, bushes and shrubs by plowing or otherwise tilling to destroy all existing natural growth. Preparation shall occur one (1) year in advance of actual plantings unless otherwise agreed to by the STATE and LANDOWNER. As compensation for cost of site preparation, the STATE will pay the LANDOWNER a lump sum of _____ upon completion of the site preparation.

The STATE will supply the materials necessary to install a fence around the easement site. The LANDOWNER shall install the fence in accordance with the STATE'S design attached hereto as EXHIBIT B, and will be paid a lump sum of _____ for said installation upon completion of the fence installation.

6. PLANTING

The STATE shall supply the planting design attached as EXHIBIT C giving the type of trees, bushes and shrubs to be planted and the spacing for planting. Trees, bushes and shrubs shall be purchased from and planted by the local Soil Conservation District for which the STATE will pay the District the actual cost of purchase and planting, as supported by itemized invoices, upon completion of the planting.

7. MAINTENANCE

During the term of the Highway Use Easement, the LANDOWNER shall provide seasonal cultivation in a manner consistant with standard shelterbelt cultivation practices until such time as the STATE notifies the LANDOWNER in writing that cultivation is no longer necessary. The STATE will pay the LANDOWNER a lump sum of _____ for each year of actual cultivation payable after each year's last cultivation.

The LANDOWNER shall be responsible for normal maintenance of the fence in an acceptable condition consistant with initial installation. In the event of extensive fence loss due to natural disaster, new materials will be supplied by the STATE and installation will be by the LANDOWNER without cost to the STATE.

The replacement of trees, bushes and shrubs shall be at the direction of the STATE and the cost of such replacement will be the responsibility of the STATE. Payment for replacement purchase and planting shall be as per paragraph 6 of the agreement.

8. ACCESS

The LANDOWNER agrees to permit the STATE access to the site of the Highway Use Easement. Such access is allowed over other lands the LANDOWNER owns or leases and is for the purpose of inspecting or performing other work on the living snow fence and its appurtenances. The LANDOWNER reserves the right to designate a reasonable route over which such access shall be made; however, the LANDOWNER agrees not to prohibit access during the term of the Highway Use Easement or any renewal.

9. CANCELLATION

The Highway Use Easement may be terminated before the expiration of the ten (10) year period only by mutual consent of the LANDOWNER and the STATE.

In the event of cancellation, the trees, bushes and shrubs and the fence become the property of the LANDOWNER.

10. COVENANTS

This Highway Use Easement and the covenants herein contained shall inure to the benefit of and be obligatory upon the agents, legal representatives, employees, administrators, executors, heirs, assigns, and successors in interest of the respective parties hereto. If the landowner fails to comply with any of the terms of this easement, involved payments will not be made and the State shall have the right to accomplish, or cause to have accomplished, the noncompliance terms.

11. SPECIAL CONDITIONS

1. The State may make payments directly to involved Soil Conservation Districts for services they perform at actual costs incurred as supported by itemized invoices, upon completion of work.

2.

In witness whereof, the parties hereto have caused this Highway Use Easement to be executed as of the day and year first above written.

Approved as to form:

_____	STATE OF SOUTH DAKOTA
ASSISTANT ATTORNEY GENERAL	DEPARTMENT OF TRANSPORTATION
_____	_____
LANDOWNER	RICHARD L. HOWARD, SECRETARY
_____	
LANDOWNER	

ACKNOWLEDGMENTS

STATE OF SOUTH DAKOTA)
: SS
COUNTY OF HUGHES)

On this_____day of_____, 19___, before me _____, a Notary Public within and for said County and State, personally appeared Richard L. Howard, Secretary, Department of Transportation, known to me to be the person who is described in and who executed the within and foregoing instrument and acknowledged to me that he executed the same freely.

My Commission Expires:

_____
(S E A L)

_____
Notary Public

STATE OF SOUTH DAKOTA)
: SS
COUNTY OF)

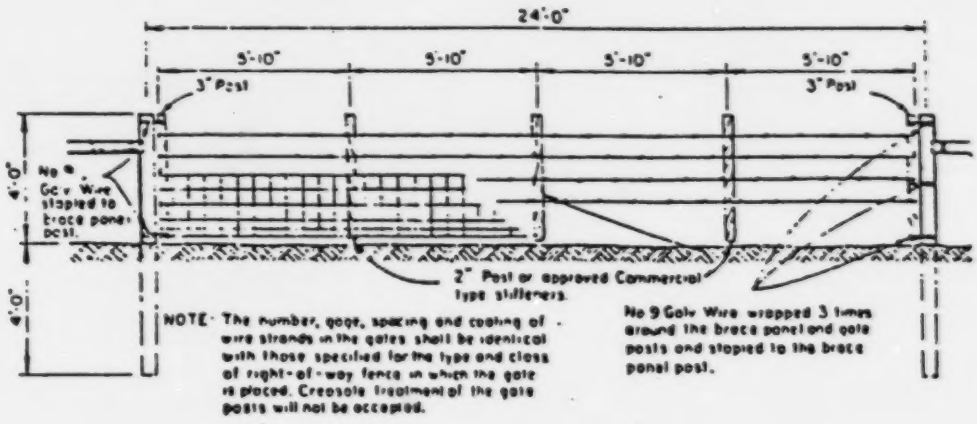
On this_____day of_____, 19___, before me _____, a Notary Public within and for said County and State, personally appeared _____, known to me to be the person who is described in and who executed the within and foregoing instrument and acknowledged to me that he excuted the same freely.

My Commission Expires:

_____
(S E A L)

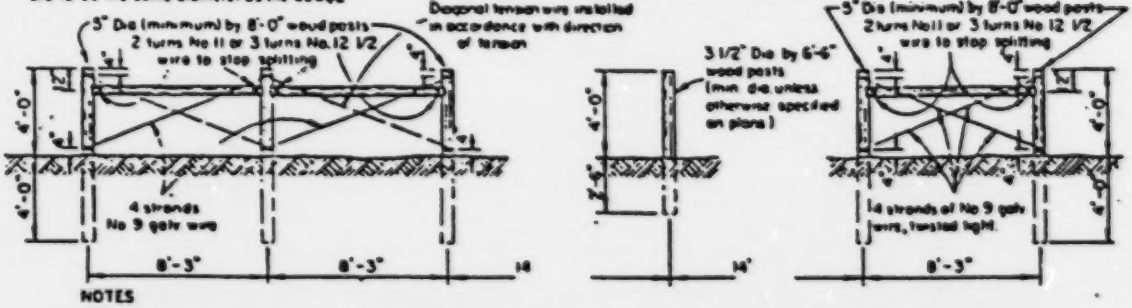
_____
Notary Public

ATTACHMENT "B"


24'-0"
5'-10"
5'-10"
5'-10"
5'-10"
3" Post
3" Post
No 9 Galv Wire stapled to brace panel post.
4'-0"
4'-0"
2" Post or approved Commercial type stiffeners.
NOTE: The number, gage, spacing and coating of wire strands in the gates shall be identical with those specified for the type and class of right-of-way fence in which the gate is placed. Creosote treatment of the gate posts will not be accepted.
No 9 Galv Wire wrapped 3 times around the brace panel and gate posts and stapled to the brace panel post.

WIRE GATE

Braces to consist of 4" diameter (minimum) wood posts, 8 feet long or rough 4"x 4"x 8' timber. Shallow notches are cut in Brace-Panel Posts to accept braces and tied together with 3/8" ϕ x 4" galvanized steel dowel or 1/2" ϕ x 4" ungalvanized steel dowel, extending 2" into the vertical Brace Panel. The bored holes for the dowel in the Brace Post and Brace are to be the same diameter as the dowel.

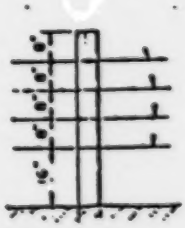

5" Dia (minimum) by 8'-0" wood posts
2 turns No 11 or 3 turns No. 12 1/2 wire to stop splitting
Diagonal tension wire installed in accordance with direction of tension
4'-0"
4'-0"
4 strands No 9 galv wire
8'-3"
8'-3"
14'
3 1/2" Dia by 6'-6" wood posts (min dia unless otherwise specified on plans)
4'-0"
2'-6"
14'
5" Dia (minimum) by 8'-0" wood posts
2 turns No 11 or 3 turns No 12 1/2 wire to stop splitting
4'-0"
4'-0"
14 strands of No 9 galv wire, twisted tight.
8'-3"

NOTES

Two-Post Brace-Panel, as shown shall be installed every 80 rods. In lengths of fence longer than 80 rods and shorter than 160 rods, Two-Post Brace-Panels shall be installed at approximately the midpoints. Two-Post Brace-Panels shall also be installed at any sharp vertical angle crest points, as directed by the Engineer.

Panels shown above, except that the central post shall be notched and doweled to conform with the angle of the brace.

DETAILS OF LINE POST AND ARRANGEMENT OF 2-POST AND 3-POST BRACE-PANELS (POST LENGTHS SHOWN ARE MIN. LENGTH)

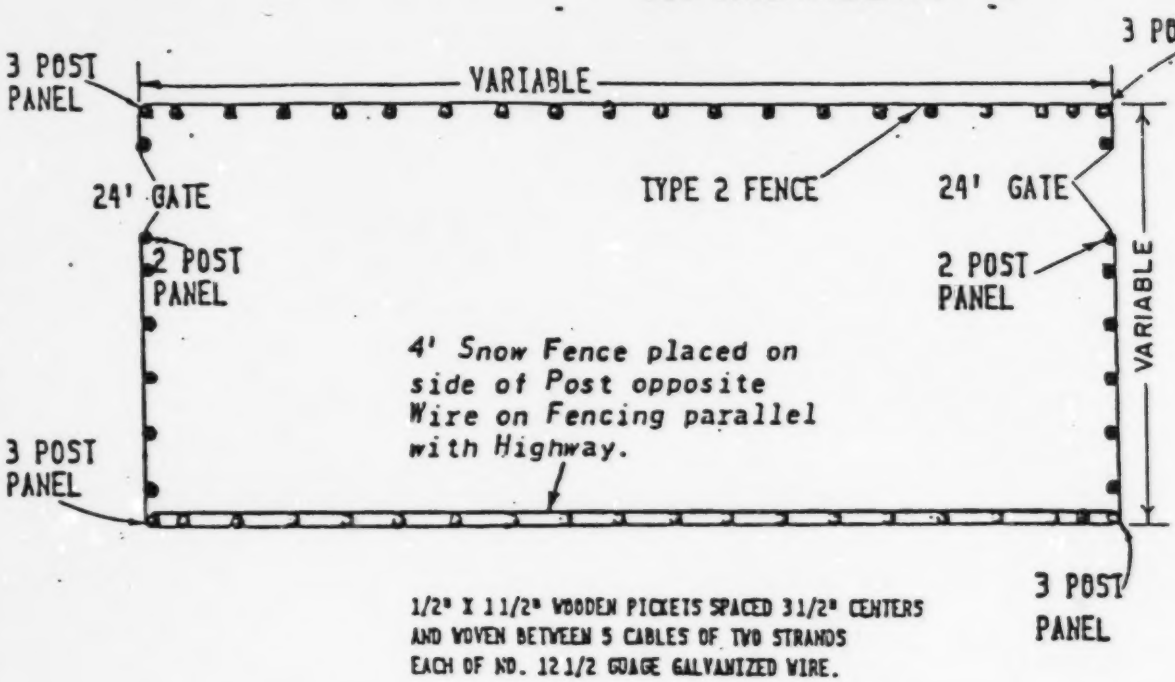


Type 2
4-WIRE BARBED

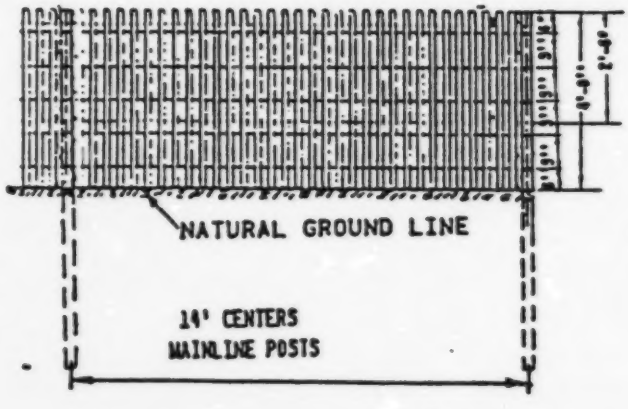
SOUTH DAKOTA
DEPARTMENT OF TRANSPORTA

DETAILS FOR CONSTRUCTI
OF
RIGHT-OF-WAY FENCE

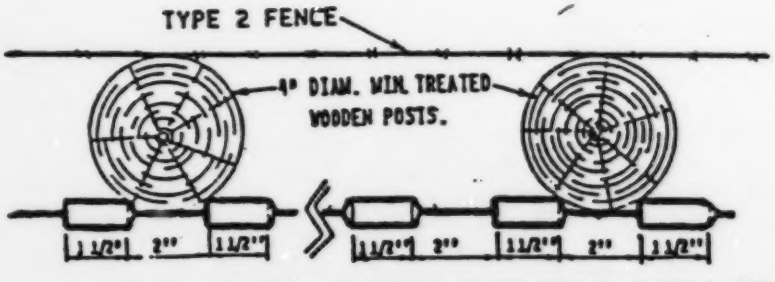
ATTACHMENT "B"



1/2" X 1 1/2" WOODEN PICKETS SPACED 3 1/2" CENTERS AND WOVEN BETWEEN 5 CABLES OF TWO STRANDS EACH OF NO. 12 1/2 GUAGE GALVANIZED WIRE.



FRONT ELEVATION OF PICKET SNOW FENCE



TYPICAL SECTION THROUGH SNOW FENCE POST & PICKETS

NOTE:
PICKET FENCE IS TO BE STRETCHED TIGHT AND SECURELY FASTENED TO ALL POST BY STEEL STAPLES.

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATIC

DETAILS FOR CONSTRUCTION OF RIGHT-OF-WAY FENCE AND SNOW FENCE

LIVING SNOW FENCE - SEQUENCE OF EVENTS

1. The DOT region will select locations where living snow fence is needed and submit the list of locations to the Division of Forestry to verify if the site will support trees, either by consulting the published soil survey or by checking with the local Conservation Districts.

2. If the site will support trees, the Division of Forestry will compile a list of suitable tree and shrub species and develop possible planting designs. The forester may request assistance from local Conservation District or SCS personnel. A list of acceptable sites will be returned to the DOT region who will determine ownership.

3. An appointment is made with the landowner to meet with representatives from the DOT region, Division of Forestry and local Conservation District to explain the living snow fence program. If the landowner is unwilling to participate in the progrm, no further discussion is necessary and the site will be removed from further active consideration.

4. If the landowner is willing to participate, the representatives will negotiate the per acre easement payment, site preparation payment and maintenance payments. As a guide for easement rates, use 10 times the annual lease rate per acre of the attached guide for crop land and pasture land by county. As a guide, $25-$50 per acre should be used for site preparation and $80-$125 per acre should be used for annual maintenance. These guides may be exceeded if conditions warrant.

5. Once an agreement has been reached concerning conditions and rates, the Living Snow Fence Highway Use Easement is to be completed, signed and submitted to DOT Operations to secure approval. Upon approval, DOT region, forester, landowner and Conservation District will receive copies.

6. The DOT region will prepare a voucher for the easement payment upon receiving the approved agreement.

7. Once the easement is secured, the forester with the region DOT and local Conservation personnel will stake out the site.

8. If the site is to be summer fallowed for one growing season prior to planting, the forester will inspect the site and make contacts as necessary to ensure that this is accomplished prior to July 1. Upon acceptable completion of site preparation, and fence installation where required, the forester will notify the DOT region who in turn will prepare a voucher for payment of completed items.

9. The forester will make sure that trees and shrubs are ordered through the local Conservation District for the living snow fence and that arrangements have been made for planting. The forester will notify the DOT region on completion of planting so a voucher for payment can be prepared.

10. The forester will make a final inspection of the site in late summer or early fall of the year of planting to ensure the site and trees are properly maintained and to make a count of missing and dead trees so they may be ordered and replaced. The forester will inspect, or will make arrangements for local Conservaton District personnel to inspect, each living snow fence site

in the late summer or early fall (before leaf drop) of subsequent years to ensure that it is being adequately maintained and protected, and to obtain a count so that mortality can be replaced the following spring.

11. The forester will arrange to have needed replacements completed and notify the DOT region when replacement plantings have been completed so a voucher for payment can be prepared.

12. The forester will notify the DOT region when the last cultivation of the season has been satisfactorily completed so a voucher for payment of maintenance can be prepared. The forester will notify the DOT region and the landowner when cultivation is no longer required.

13. The forester will maintain records of the plantings, site maintenance and overall living snow fence progress and submit periodic reports to the DOT region who will in turn pass the information on to DOT Operations.

Revised Nov. 29, 1984
Revised Feb. 28, 1986

LIVING SNOW FENCE
LEASE RATES
PER ACRE PER YEAR

COUNTY	CROP LAND	GRASS LAND
Aurora	$15 - 25	$5 - 10
Beadle	20 - 30	5 - 15
Bennett	10 - 20	5 - 10
Bon Homme	25 - 45	10 - 20
Brookings	30 - 60	15 - 30
Brown	20 - 40	5 - 15
Brule	15 - 30	5 - 10
Buffalo	15 - 30	5 - 10
Butte	10 - 25	5 - 10
Campbell	10 - 25	5 - 15
Charles Mix	15 - 35	5 - 15
Clark	20 - 40	10 - 20
Clay	50 - 75	15 - 35
Codington	20 - 45	10 - 25
Corson	10 - 25	5 - 10
Custer	10 - 25	5 - 10
Davison	20 - 40	5 - 15
Day	15 - 35	5 - 15
Deuel	20 - 40	10 - 20
Dewey	10 - 25	5 - 10
Douglas	20 - 40	10 - 20
Edmunds	10 - 30	5 - 15
Fall River	10 - 25	5 - 10
Faulk	10 - 25	5 - 10
Grant	20 - 45	10 - 20
Gregory	10 - 30	5 - 15
Haakon	10 - 25	5 - 10
Hamlin	20 - 45	10 - 25
Hand	10 - 35	5 - 10
Hanson	20 - 45	10 - 20
Harding	10 - 25	5 - 10
Hughes	10 - 30	5 - 15
Hutchinson	25 - 50	10 - 25
Hyde	10 - 25	5 - 10
Jackson	10 - 25	5 - 10
Jerauld	10 - 30	5 - 15
Jones	10 - 25	5 - 15
Kingsbury	20 - 45	10 - 25
Lake	25 - 50	10 - 25
Lawrence	10 - 25	5 - 10
Lincoln	40 - 75	10 - 35
Lyman	10 - 30	5 - 15

LIVING SNOW FENCE
LEASE RATES
PER ACRE PER YEAR

COUNTY	CROP LAND	GRASS LAND
Marshall	20 - 40	10 - 20
McCook	25 - 50	10 - 25
McPherson	10 - 30	5 - 15
Meade	10 - 30	5 - 10
Mellette	10 - 25	5 - 15
Miner	15 - 35	5 - 15
Minnehaha	40 - 75	15 - 35
Moody	40 - 75	15 - 35
Pennington	10 - 30	5 - 15
Perkins	10 - 25	5 - 10
Potter	15 - 35	5 - 15
Roberts	20 - 45	10 - 25
Sanborn	10 - 30	5 - 15
Shannon	10 - 30	5 - 10
Spink	15 - 40	5 - 15
Stanley	10 - 25	5 - 10
Sully	10 - 35	5 - 15
Todd	10 - 25	5 - 15
Tripp	10 - 30	5 - 10
Turner	35 - 75	10 - 30
Union	40 - 75	15 - 40
Walworth	10 - 30	5 - 15
Yankton	30 - 60	15 - 35
Ziebach	10 - 30	5 - 10

NEBRASKA NATURAL RESOURCE DISTRICT
LIVING SNOW FENCE AND WILDLIFE HABITAT
WORKING AGREEMENT

WORKING AGREEMENT
FOR
LIVING SNOW FENCE AND WILDLIFE HABITAT

Landowner Agrees To:

1. Provide a strip of land_____feet wide and_____ feet long located in the_____of section_____in township_____range_____ _____.

County Commissioners Agree To:

1. Cover the cost of materials for one long side of the fence.
2. Provide the manpower to construct and maintain the fence according to the NRD and Game and Parks Commissions specifications.
3. Prepare the tree planting site by chemical fallowing the tree rows for one year prior to planting.
4. Replant missing trees for a period of two years following the year of planting.

Upper Niobrara-White NRD Agrees To:

1. Provide the districts tree planting service for planting the trees.
2. Provide chemical weed control for a period of three years following planting.
3. Provide handplants for a period of two years following the year of planting.
4. Provide technical assistance for planning and establishment of the Living Snow Fence.

Nebraska Game and Parks Commission Agrees To:

1. Reimburse the District for the cost of fencing materials at a rate not to exceed $6 per rod for 2 sides only, defined as 1 long side and 2 short sides.
2. Allow as an option the fencing of the fourth side, short of the roadside boundary, at other than Commission cost.
3. Reimburse the District for the cost of plant materials utilized within the fenced area only.

This agreement shall be in effect from_____to_____. It is mutually agreed to by all parties that either party or parties may withdraw from this agreement upon 60 days written notice to the other parties.

LANDOWNER_____Date_____

CO. COMMISSIONERS_____"

UPPER NIOBRARA-WHITE NRD_____"

NEBR. GAME AND PARKS COMMISSION_____"

MAY 13 1982

WORKING AGREEMENT

FOR

LIVING SNOWFENCE AND WILDLIFE HABITAT

Producer Agrees To:

1. Provide a strip of land 110' wide, measured 110' north from the line of power poles along the south side of the NW¼SE¼ of Section 10-T20-R14. The strip is to start at the southwest corner of the NW¼SE¼ of Section 10-T20-R14, and run east for approximately 800'.
2. Make application for the Wildlife Habitat Program administered by the Lower Loup NRD and the Nebraska Game Commission, and comply with the rules of this program.
3. Prepare the site for the tree planting area by discing, prepare seedbed, and plant grain sorghum in the area south of the trees. Grain sorghum in this area may be combined for grain in 1982.
4. Maintain fence after installation.

Valley County Board of Supervisors Agrees To:

1. Construct the fence on the north and east side of the designated area in accordance with the specifications of the Lower Loup NRD. One 16' gate will be installed in the southeast corner of the area.
2. Plant trees in the spring of 1982, as shown on form NB-WOOD-1.
3. Provide weed control for a period of three years following planting.
4. Replant missing Red Cedar for a period of two years following the year of planting.
5. Submit a statement for fencing materials to the Nebraska Game Commission as per agreement.

Lower Loup Natural Resources District Agrees To:

1. Provide tree planting services at the regular rate of planting.
2. Provide trees and grass seed as provided in the Wildlife Habitat Program.
3. Provide the annual per acre payment as provided in the Wildlife Habitat Program.
4. Provide technical assistance to plan, layout, and inspect installation to the extent that assistance is available to the Lower Loup NRD by the Soil Conservation Service.

PRODUCER _____ DATE _____

LOWER LOUP NRD _____ DATE _____

VALLEY COUNTY BOARD OF SUPERVISORS _____ DATE _____

MAY 1 3 1982

WORKING AGREEMENT

FOR

LIVING SNOWFENCE AND WILDLIFE HABITAT

Producer Agrees To:

1. Provide a strip of land 100' wide, measured 100' from the boundary line fence along the South side of SE¼ Section 11-20-13. This strip to start at the Southwest corner of SE¼ Section 11-20-13, and running East for approximately 1550'.

2. No preparation is required for this site. Trees will be planted into native sod with the scalper attachment on the tree planter.

3. Maintain fence after installed.

4. Make application for Habitat Program administered by the Lower Loup Natural Resources District and the Nebraska Game Commission; and comply with the rules of this program.

Valley County Board of Supervisors Agrees To:

1. Construct the fence to the Lower Loup Natural Resources Districts specifications.

2. Plant trees as shown on Form NB-WOOD-1.

3. Provide weed control for a period of three years.

4. Replant missing trees for a period of two years following year of planting.

Lower Loup Natural Resources District Agrees To:

1. Provide tree planting services at the regular rate for planting.

2. Provide fencing materials and trees as outlined in the Habitat Plan.

3. Provide technical assistance to plan, layout, and inspect installation to the extent that technical assistance is available to the Lower Loup Natural Resources District by the Soil Conservation Service.

PRODUCER _____ DATE _____

LOWER LOUP NRD _____ DATE _____

VALLEY COUNTY BOARD OF SUPERVISORS _____ DATE _____

AGREEMENT

PROJECT NO. F-136-4(1003), STATE CONTROL NO. 41196
LOWER REPUBLICAN NATURAL RESOURCES DISTRICT
STATE OF NEBRASKA, DEPARTMENT OF ROADS
LIVING SNOW FENCE-WILDLIFE DEVELOPMENT PROGRAM
RED CLOUD EAST AND WEST

THIS AGREEMENT, entered into between the Lower Republican Natural Resources District, Alma, Nebraska, hereinafter referred to as the "District", and the State of Nebraska, Department of Roads, hereinafter referred to as the "State".

WITNESSETH:

WHEREAS, the State has plans for the development of a Living Snow Fence-Wildlife Habitat Program along Highway US-136 between Reference Post 70+93 and Reference Post 90+80 on the left, and

WHEREAS, the State desires the District to furnish and plant the trees and shrubs for the above described Living Snow Fence-Wildlife Habitat, and

WHEREAS, the State is willing to reimburse the District for the above described work in accordance with the following terms.

NOW THEREFORE, in consideration of these facts, the parties agree as follows:

SECTION 1. The District agrees to furnish and plant the trees and shrubs for the Living Snow Fence-Wildlife Habitat adjacent to Highway US-136 between Reference Post 70+93 and Reference Post 90+80 on the left and shall be accomplished according to and in the manner provided by the plans and specifications to be prepared and furnished by the State, said plans and specifications are, by this reference, made a part of this agreement.

SECTION 2. The State agrees to reimburse the District for the work described in Section 1 above in an amount not to exceed the District's going rate for labor for planting trees and shrubs, which is estimated to be $0.30, and furnishing the trees and shrubs, which is estimated to be $0.35. Based upon the estimate attached hereto, identified as Exhibit "A" and hereby made a part of this agreement, the current estimated cost of furnishing and planting the trees and shrubs is $3,275.35. Upon satisfactory completion of the work described in Section 1 above, the District shall bill the State for the District's actual quantity of trees and

shrubs furnished and planted at the above agreed upon costs. The State agrees to pay the District within thirty (30) days after receipt of said billing, subject to final audit by the State.

SECTION 3. The District agrees to provide replacement plantings for two (2) years from the date of satisfactory completion of the first planting of the trees and shrubs at the direction of the State's District Personnel and the State's Roadside Development personnel. For the first year of replacement plantings, the State will reimburse the District in an amount not to exceed the District's going rate for labor for planting trees and shrubs, which is estimated to be $0.42, and furnishing the trees and shrubs, which is estimated to be $0.38, plus $75.00 for mobilization and $35.00 for inspection. It is understood that the minimum cost for the first year's replacement planting will be $275.00. For the second year of replacement planting, the State will reimburse the District in an amount not to exceed the District's going rate for labor for planting trees and shrubs, which is estimated to be $0.45, and for furnishing the trees and shrubs, which is estimated to be $0.40, plus $60.00 for mobilization and $40.00 for inspection. It is understood that the minimum cost for the second year's replacement planting will be $100.00. Upon the satisfactory completion of each year's replacement planting, the District may bill the State for the District's actual quantity of trees and shrubs furnished and planted at the above agreed upon costs. The State agrees to pay the District within thirty (30) days after receipt of said billing, subject to audit by the State.

SECTION 4. The District further agrees to accomplish ground preparation by tilling, in strict accordance with the plans and specifications for this project. The State agrees to reimburse the District for the tilling work in the lump sum amount of $500.00.

SECTION 5. The District also agrees to apply weed control in four (4) annual applications, in the fall of 1987, 1988, 1989, and 1990, in strict accordance with the plans and specifications for this project. The State agrees to reimburse the District for applying weed control in an amount not to exceed the District's going rate for each application of weed control, which is estimated to be $0.12 per tree and shrub for fall of 1988 and 1989 and $0.15 per tree and shrub for fall of 1990. It is understood that weed control in the fall of 1987 shall be done at no cost to the State. Based on

the estimate attached, identified as Exhibit "A", the cost of four (4) applications of weed control is estimated to be $1,965.21. Upon satisfactory completion of each weed control application, the District may bill the State for the actual number of trees and shrubs treated at the above agreed upon cost. The State agrees to pay the District within thirty (30) days after receipt of said billing, subject to audit by the State.

SECTION 6. The District also agrees that all of the first planting for this project shall be accomplished between March 15, 1988 and May 15, 1988.

SECTION 7. The State agrees to provide fencing, easements and maintenance for this project.

SECTION 8. The District shall maintain all books, documents, accounting records and other evidence pertaining to costs incurred and shall make such material available at its office at all reasonable times during the contract period and for three (3) years from the date of final payment under this agreement; such records to be available for inspection by the State, or any authorized representatives of the State, and copies thereof shall be furnished by the District if requested.

SECTION 9. The District agrees to abide by the provisions of the Nebraska Fair Employment Practices Act as provided by Neb.Rev.Stat. §48-1101, 48-1103 through 48-1113, 48-1115 through 48-1126 (Reissue 1984); 48-1102, 48-1114, (Supp. 1986).

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by their proper officials thereunto duly authorized as of the dates below indicated.

EXECUTED by the District this _____ day of _____, 19__.

ATTEST:

LOWER REPUBLICAN NATURAL RESOURCES DISTRICT

_____

_____
General Manager

EXECUTED by the State this _____ day of _____, 19__.

STATE OF NEBRASKA
DEPARTMENT OF ROADS

_____
Deputy Director-Engineering

ESTIMATE OF COST TO BE INCURRED BY
LOWER REPUBLICAN NATURAL RESOURCES DISTRICT
FOR
PROJECT NO. F-136-4(1003)-RED CLOUD EAST AND WEST

Cost of Plant Material

	Est. Quantity	Unit	Est. Unit Price	Amount
Red Cedar	2,173	Each	0.35	$760.55
Austrian Pine	936	Each	0.35	327.60
Skunkbush Sumac	1,087	Each	0.35	380.45
Honeysuckle	843	Each	0.35	295.05

Cost of Planting

	Est. Quantity	Unit	Est. Unit Price	Amount
Red Cedar	2,173	Each	0.30	$ 651.90
Austrian Pine	936	Each	0.30	280.80
Skunkbush Sumac	1,087	Each	0.30	326.10
Honeysuckle	843	Each	0.30	252.90
			Subtotal	$3,275.35

Cost of Ground Preparation

	Est. Quantity	Unit	Est. Unit Price	Amount
Fall Ground Preparation	1	Lump Sum	$500.00	$ 500.00
			Subtotal	$ 500.00

Cost of Weed Control

	Est. Quantity	Unit	Est. Unit Price	Amount
Furnishing and applying per tree (fall 1987)	5,039	Each	No charge	----
Furnishing and applying per tree (fall 1988)	5,039	Each	0.12	$ 604.68
Furnishing and applying per tree (fall 1989)	5,039	Each	0.12	604.68
Furnishing and applying per tree (fall 1990)	5,039	Each	0.15	$ 755.85
			Subtotal	$1,965.21

Cost of Replacement Planting

	Est. Quantity	Unit	Est. Unit Price	Amount
Spring 1989				
Mobilization	1	Each	75.00	$ 75.00
Labor for Inspection	1	Each	35.00	35.00
Plant Material	750	Each	0.38	285.00
Planting	750	Each	0.42	$ 315.00
				$710.00
				($275.00 minimum)
Spring 1990				
Mibilization	1	Each	60.00	$ 60.00
Labor for Inspection	1	Each	40.00	40.00
Plant Material	150	Each	0.40	60.00
Planting	150	Each	0.45	$ 67.50
				$ 227.50
				($100.00 minimum)
			Subtotal	$ 937.50
			Grand Total	$6,678.06

IOWA DEPARTMENT OF TRANSPORTATION
STANDING ROW CROP AGREEMENT

Iowa Department of Transportation

VALUE FINDING
FOR STANDING ROW CROPS
FOR SNOW BREAK PURPOSES

COST CENTER 552205

County Kossuth
Route US 169
Parcel No. 55-5-169

VOUCHER NO. 50821

CONTRACT NO. _____

Parties Interest in Growing Crops *(Payees)*

Frank Stork Land Owner

_____ Tenant

(If land tenanted on cash basis, landlord need not be named payee. Where tenanted on a crop-share basis, both tenant and landlord execute agreement.)

Number of Rows of Standing Corn = 4 ; Total width of all rows = 10 ft.

Length of Rows = 1700 ft.; Station 723+00 to 740+00.

Total area of standing corn rows to remain unharvested:

= Length 1700 x width 10 ÷ 43,560 sq. ft./ac. = .39 acres

Estimated yield per acre = 180 bushels

Present market price - $ 2.75 /bu. as of 04 / 01 / 91

Compute total value of standing crop to remain:

= $ 2.75 /Bu. x 180 Bu./Acre yield x .39 acres

= $ 193.05 total value of crops to remain unharvested.

Date 11-7-90 R. L. Hadachek
Appraiser

Date 11-1-90 [signature]
Resident Maintenance Engineer

Date 12/10/90 James Gillett
District Maintenance Engineer

Iowa Department of Transportation

STANDING ROW CROP AGREEMENT SNOW BREAK PURPOSES

County Kossuth
Route No. US 169
Parcel No. 55-5-169

For ref. only: From Sta. 723+00 to sta. 740+00 on the ___ west side
From Sta. ___ to sta. ___ on the ___ side

THIS AGREEMENT made and entered into this 1st day of November, A.D. 19 90 by and between FrankStork
RR 2
Bancroft, Iowa 50517

Lessor and the Iowa Department of Transportation acting for the State of Iowa, Lessee, wish to establish a standing corn temporary snow fence windbreak in order to reduce snow drifting across the highway and improve the safe operation of motor vehicles.

1. In order to establish and maintain a row crop *(corn)* snow fence on the premises, Lessor hereby leases the premises to Lessee from the 1st day of Nov., 19 90 to the 1st day of April 19 91 in accord with the following terms:

2. The premises is situated in the ___ of Sec. ___ in Twp. ___ Range ___ County Kossuth State of Iowa.

3. Lessor agrees to maintain 4 rows of standing corn 1700 ft. long in one continuous strip.
Lessor agrees to maintain ___ rows of standing corn ___ ft. long in one continuous strip.

4. Lessor agrees that the standing corn strip will be approximately 110 ft. from the right of way line/fence *(the nearest corn row)*.

5. Total lease area .39 acres. The Lessee agrees to pay the Lessor for the value of the crop as computed on the yield of the remainder of the field at the market rate at the time the lease is signed.

6. Lessee agrees to pay and Lessor agrees to accept as rent the Amount of $ 193.05 with payment due 45 days after approval of this agreement.

7. Lessor agrees to take necessary measures to prevent livestock from entering the area and prevent damage to the row crop snow fence.

8. Lessee agrees to pay and lessor agrees to accept payment of rent under this agreement as full payment for all field preparation losses or crop damages caused by the establishment or maintenance of the standing corn snow fence.

9. Upon expiration of the term of this agreement, the Lessor may harvest the crop and Lessee shall have no further rights or obligations whatsoever, either to pay rent or with respect to maintenance or removal of the crop.

10. Additional provisions include: ___

Frank Stork
Lessor

478-30-4142

Frank Stork
RR 2 Bancroft, Iowa 50517
Address

515-885-2070
Telephone

Date

APPROVED
IOWA DEPARTMENT OF TRANSPORTATION

APPROVAL RECOMMENDED:

By [signature] 11-21-90
Resident Maintenance Engineer Date

[signature] 12/10/90
District Maintenance Engineer Date

Telephone 515-582-4298

APPENDIX E
Mail-Back Survey Instrument and Survey Results

May 24, 1991 1305-01

1~

Dear 2~:

Our firm has recently been retained by the Ontario Ministry of Transportation to examine the feasibility of delegating to landowners, the responsibility for installing and maintaining snow fences and hedges on their property adjacent to highway snow drifting sites. If deemed feasible, we are to prepare a model landowner agreement for such services. Essentially, the Ministry is reviewing cost-effective and operationally-sound alternatives to current snow fencing operations which will ultimately increase winter road safety.

As part of this investigation, we are contacting provincial and state highway authorities such as yours, to discover the research and practical experience you have had with any form of "co-operative" snow control ventures with landowners.

I've attached a one page mini-questionnaire which highlights the topics of research we are most interested in. These topics include: co-operative snow control literature you are aware of; compensation (labour, materials, storage, etc.) for landowners under any co-operative scenarios; implications for staffing, workloads and budgets within the affected Department or Division, and; existing landowner agreements that you may be aware of.

I would appreciate it if you could forward your written response to us by June 7, 1991. Alternatively, we will accept collect calls or faxes should you wish to relay any information to us in that way. Should you indicate an interest in the results of this study, I will relay your interest to our client at the Ontario Ministry of Transportation, Research and Development Branch, in Toronto.

Thanks for you attention to this matter.

Sincerely yours,

Paul H. Brubacher, M.Sc., P.Ag.
Rural Development Consultant

PB/er
enclosure

May 1991

SURVEY OF CO-OPERATIVE SNOW CONTROL INITIATIVES

i) Please identify key literature (scientific, extension, etc.) and its source that you are aware of that relates to snow control ventures undertaken in co-operation with landowners. Include literature related to temporary and permanent fencing, as well as snow hedges.

ii) Please describe any of your Department's experience in working with landowners on snow control ventures. Issues may include: who buys, stores and repairs fencing; how much and on what basis is compensation paid to the landowner; how is landowner held liable if he defaults on the agreement; changes in the role of your staff in maintenance and inspection under co-operative arrangements; landowner acceptance of the concept and practice of living snow fencing (if attempted); on what scale were any co-operative ventures initiated (eg. pilot project over certain length of road/geographic area).

SURVEY OF CO-OPERATIVE SNOW CONTROL INITIATIVES

iii) **What changes in staffing, workloads and budgets have been experienced within any affected Department or Division as a result of co-operative ventures?**

iv) **If you have any landowner agreements in hand, and would be willing to share them with us, we would appreciate receiving a copy of such. Alternatively, please identify any essentials you feel should be included in such an agreement.**

v) **Do you know others who would have more information on the topic of co-operative snow control initiatives? If yes, please identify by name and location.**

Thanks for your participation!

Provincial and State Experience in Co-operative Snow Control Ventures

Contact/Jurisdiction	Type of Snow Control Venture (Fencing/Hedging)	Related Experience	Details of Agreement
Albert Arklie, Dir. of Maintenance Newfoundland Dept. of Transportation	- snow fence	- none	No agreements made with landowners - the Department Act permits entry upon private lands to install and remove snow fencing
Clive Woods, New Brunswick Dept. of Transportation	- snow fence	- none	Verbal agreement with landowner - Department installs, maintains, and removes all snow fencing - Department contacts landowners each year to advise of dates planned for installation and removal of snow fences on private property
Ken McDermid, Dir. of Maintenance, Nova Scotia Dept. of Transportation	- snow fence	- none	- No co-operative ventures.
G. Trainor, Dir. of Highway Maintenance, P.E.I. Dept. of Transportation	- snow fence	- none	Verbal agreement with landowner - the Department arranges with the landowner for the Department staff to erect snow fence each fall after harvest and take down each spring prior to planting - Department supplies and maintains fence - no compensation paid to landowner - no record of a landowner ever defaulting on this agreement - landowners see the benefits of snow fence in improving travelling conditions - Section 35 of Roads Act permits Ministry to enter any property and erect/maintain snow fences.

Provincial and State Experience in Co-operative Snow Control Ventures

Contact/Jurisdiction	Type of Snow Control Venture (Fencing/Hedging)	Related Experience	Details of Agreement
Monique Plamondon, Quebec Ministry of Transportation	- snow fence - corn standing adjacent to roads		- last winter, the Ministry worked with two landowners along Highway 35 - landowners left 30 m of corn nearest the highway standing throughout the winter to reduce drifting snow - compensation to landowner based on crop insurance value of corn
J.B. Rowley, Dir, of Maintenance, Manitoba Dept. of Transportation	- snow fence - snow hedge	- Department of Highways and Transportation erects ~7000 rolls (100 ft. rolls) of snow fence/year - they also maintain 108 km of snow hedge	- presently no co-operative snow control ventures with landowners
Ron Hastings, Maintenance Analyst, Saskatchewan Dept. of Transportation	- snow fence - snow hedge	- pilot project conducted in late 1970's using hedges for snow control - worked well but never pursued	- no "co-operative" snow control ventures with landowners using snow fences - pilot project was a verbal agreement with landowner - department planted hedges, landowners maintained them - an Agriculture Canada Nursery provided trees at no charge - used caragana, lilac and siberian elm - farmers were free to select type of hedge desired - nursery offered expertise on how to care for trees

Provincial and State Experience in Co-operative Snow Control Ventures

Contact/Jurisdiction	Type of Snow Control Venture (Fencing/Hedging)	Related Experience	Details of Agreement
Ivan Perich, Assistant District Transportation Engineer, Alberta Transportation & Utilities	- snow hedges - snow fence - backsloping of highway slope	- Ivan Perich presented a paper on backsloping for reduced snow and ice control costs for 1991 ISCORD Conference in Edmonton	- Alberta Transportation has prepared a first draft of revised snow fencing standards - consent from landowner is to be obtained prior to the erection of snow fence on private property - this consent is to be documented - wherever the right-of-way is of sufficient width, installation on private property should be avoided - 20-30 years ago, caragana hedges were planted adjacent to Highway 9 - they were found to be very effective in stopping snow from reaching highways - property owner was expected to maintain hedges - no information available on the type of agreement used for this venture
J. Lee, Maintenance Systems Engineer, British Columbia Ministry of Transportation	- no "co-operative" snow control ventures with landowners presently exist	- have used snow berms on private property through informal arrangement with landowners - no details provided - province maintains a very small inventory of snow fences	- although province has no "co-operative" snow control program with landowners, such a program should include: i) fencing standards (i.e. material, configuration, installation standards, maintenance schedules) ii) agreement with landowner on compensation, response time iii) Quality Assurance program to ensure standards are met.

Provincial and State Experience in Co-operative Snow Control Ventures

Contact/Jurisdiction	Type of Snow Control Venture (Fencing/Hedging)	Related Experience	Details of Agreement
Paul Theberge, Division Engineer, Maine Dept. of Transportation	- snow fences - snow hedges	- the need for snow fences has dropped substantially in recent years	- verbal agreement with landowners for department to erect and remove snow fences each year - several landscaping projects on the Interstate System have been conducted using "living" snow fences
R. Mackay, New York State Thruway Authority	- none	- none	- none
Frank Battaglia, Chief of Maintenance, New Jersey Dept. of Transportation	- none	- none	- none
Michael Ryan, Director Bureau of Maintenance and Operations, Pennsylvania Dept. of Transportation	- snow fences	- use of snow fences over past 10 years has decreased as a result of milder winters	- the State Highway Act authorizes Department of Transportation personnel to enter private property for purposes of erecting, maintaining and removing snow fences - written authorization is required from the landowner before entrance on to property is permitted and the landowner signs an authorization to enter farm.
Maurice Witteveen, Engineer of Maintenance, Michigan Dept. of Transportation	- snow fence	- Michigan DOT uses very little snow fence - do not erect snow fence on private property	- no landowner agreements presently exist
Ernest Herrick, Maintenance Planning Manager, Connecticut Dept. of Transportation	- none	- none	- none
Larry Goode, Indiana Dept. of Transportation	- snow fence	- one district in Northern Indiana erects snow fencing along state owned rights-of-way	- no landowner agreements

Provincial and State Experience in Co-operative Snow Control Ventures

Contact/Jurisdiction	Type of Snow Control Venture (Fencing/Hedging)	Related Experience	Details of Agreement
William Bordhin, Regional Maintenance Engineer, Wisconsin Dept. of Transportation	- snow fence	- counties are paid by the state to erect structural snow fences	- verbal agreement with landowners for site access - state will compensate landowner for any damages to property
Leland Smithson, Maintenance Engineer, Iowa Dept. of Transportation	- Iowa's Wind Erosion Control Incentive Program (WECIP) - Iowa pays farmers adjacent to the highway the value of their crop left in place as standing row crop snow breaks	- WECIP - Iowa DOT establishes windbreaks on farmland parallel to primary highways, with the landowner being paid for the use of the land - the land is rented from the landowner for 10 years	- aside from WECIP, Iowa DOT places snow fences through areas of snow drifting problems where verbal permission from the landowners can be obtained - landowners choose a three row or five row windbreak - the DOT furnishes plants and maintains the windbreak for two years - property owners control the use of the land (e.g. hunting) after the second year - landowner is not obliged to participate - voluntary - standing row crop snow breaks - the farmer agrees to leave 4 - 8 rows of standing corn parallel to highway
John Cole, Engineer, Wyoming State Highway Department	- snow fence - living snow fence experiments currently underway	- the state planted 6" seedlings on adjacent landowner property 7 years ago	- snow fences - the state enters into a perpetual easement agreement with landowner and pays $1.00 per lineal foot for this right of entry onto property

Provincial and State Experience in Co-operative Snow Control Ventures

Contact/Jurisdiction	Type of Snow Control Venture (Fencing/Hedging)	Related Experience	Details of Agreement
John Cole, Engineer, Wyoming State Highway Department cont'd	- living snow fence experiments currently underway cont'd	- landowners were paid a nominal easement rate - they have no responsibility regarding upkeep of living snow fence - this is a long range (20 year) experiment - another experiment involved planting 6 to 10 ft trees adjacent to highways - DOT fenced trees and watered them - no formal agreement with landowner	

APPENDIX F
Analysis of Selected MTO Snow Fence Operations Records

TABLE 1/ ANALYSIS OF MTO SNOW FENCE MAINTENANCE OPERATIONS REPORTS FOR DISTRICTS 1 to 6 IN WESTERN ONTARIO 1988/89

Snow Fence Erection

District #		Expenditure	Average Metres	Cost per Metre
1.	Chatham	$ 36 536	21 863	$1.67
2.	London	17 846	12 573	1.42
3.	Stratford	18 480	11 020	1.67
4.	Burlington	50 182	22 439	2.24
5.	Owen Sound	46 379	22 542	2.08
6.	Toronto	57 379	13 933	4.12
	Total*	$227 349	104 372	Avg: $2.18

* Average cost per metre to erect snow fence in above 6 districts is $2.18 Range $1.42 to $4.82.

Snow Fence Removal

District #		Expenditure	Average Metres	Cost per Metre
1.	Chatham	$13 161	17 816	$0.73
2.	London	7 964	11 397	0.70
3.	Stratford	8 113	6 388	1.27
4.	Burlington	19 521	18 445	1.06
5.	Owen Sound	15 193	24 790	0.61
6.	Toronto	$13 028	9 120	$1.43
	Total	$76 980	87 956	$0.88

Note: Average cost per metre to remove snow fence in above 6 districts is $0.88 Range: $0.70 to $1.43

Summary: Therefore, total average cost to erect and remove snow fence in Districts 1 to 6 for 1988/1989 is $2.18 + .88 = $3.06/m.

TABLE 2/ ANALYSIS OF MTO SNOW FENCE MAINTENANCE OPERATIONS REPORT FOR DISTRICTS 1 to 6 IN WESTERN ONTARIO 1989/1990

Snow Fence Erection

District #		Expenditure	Average Metres	Cost per Metre
1.	Chatham	$35 899	20 164	$1.78
2.	London	16 266	10 552	1.54
3.	Stratford	7 447	5 439	1.37
4.	Burlington	42 728	22 172	1.93
5.	Owen Sound	49 387	17 091	2.89
6.	Toronto	$24 141	8 486	$2.84
	Total*	$175 868	83 904	$2.10

* Average cost per metre to erect snow fence in above 6 districts is $2.10 Range $1.54 to $2.89

Snow Fence Removal

District #		Expenditure	Average Metres	Cost per Metre
1.	Chatham	$25 899	28 391	$0.91
2.	London	10 704	11 041	0.97
3.	Stratford	9 592	10 319	0.93
4.	Burlington	30 585	28 030	1.09
5.	Owen Sound	18 721	21 140	0.89
6.	Toronto	$15 961	12 084	$1.32
	Total	$111 462	111 005	$1.00

Note: Average cost per metre to remove snow fence in above 6 districts is $1.00 Range: $0.89 to $1.32

Summary: Therefore, total average cost to erect and remove snow fence in Districts 1 to 6 is $2.10 + $1.00 = $3.10/m.

TABLE 3/ ANALYSIS OF MTO SNOW FENCE MAINTENANCE OPERATIONS REPORT FOR DISTRICTS 1 to 6 IN WESTERN ONTARIO 1990/1991

Snow Fence Erection

District #		Expenditure	Average Metres	Cost per Metre
1.	Chatham	$ 39 795	20 416.4	$1.95
2.	London	16 320	7 383.0	2.21
3.	Stratford	8 502	5 192.0	1.64
4.	Burlington	41 174	18 327.5	2.25
5.	Owen Sound	49 150	19 896.0	2.47
6.	Toronto	$ 32 797	11 226.4	$2.94
	Total	$187 738	82 404.8	$2.28

* Average cost per metre to erect snow fence in above 6 districts is $2.28 Range $1.64 to $2.94

Snow Fence Removal

District #		Expenditure	Average Metres	Cost per Metre
1.	Chatham	$18 404	17 932.6	$1.03
2.	London	7 091	7 695.9	0.92
3.	Stratford	4 892	5 873.0	0.83
4.	Burlington	18 116	20 607.1	0.88
5.	Owen Sound	12 990	15 425.0	0.84
6.	Toronto	$11 934	10 488.0	$1.14
	Total	$73 427	78 021.4	$0.94

Note: Average cost per metre to remove snow fence in above 6 districts is $0.94 Range: $0.84 to $1.14

Summary: Therefore, total average cost to erect and remove snow fence in Districts 1 to 6 is $2.28 + $0.94 = $3.22/m.

APPENDIX G
Model Co-operative MTO/Landowner Snow Control Agreement

MINISTRY OF TRANSPORTATION OF ONTARIO
SNOW CONTROL
LANDOWNERS' AGREEMENT

This agreement, made and entered into this _____ day of _____, 19___, by and between _____, of: address _____, hereinafter called the OWNER, and the Ministry of Transportation of Ontario, hereinafter called MTO with respect to the following properties.

Property	Snow Control Method (as per) Parts A, B, C below)	Lot	Concession	Township	County
Property No. 1					
Property No. 2					
Property No. 3					
Property No. 4					

A sketch of each of the affected properties specifying Highway #, distance from right-of-way and from edges of property or other legally identifiable feature, and relevant technical detail is noted in Attachments A, B and/or C at the end of this Agreement.

PART A - SNOW FENCE ERECTION AND REMOVAL

In consideration of the payment or payments as specified below, the Owner agrees to erect by _____, 19___ and remove in the following spring not earlier than _____, 19___, no less than _____ m (_____ ft) of MTO-approved snow fence and _____ (#) standard steel posts on the above-specified property(ies), as illustrated in Attachment A.

MTO agrees to:

a) Supply the owner at the commencement of this agreement with an adequate supply of serviceable steel posts and approved snow fence with which to erect the above stated length of snow fence.

b) Transfer custody, care and control of the above noted materials to the owner which will remain in effect during the term of this agreement.

c) Provide a quantity of wire ties, guy wire, and wood slats for erecting plastic snow fence if required, sufficient to erect the required amount of snow fence.

d) Provide one post pounder and one twisting tool to be used for attaching the fence to the posts, where required.

e) Pay the owner on or before April 30, 19___, a lump sum amount of $_____ based on $_____/m ($_____/ft) of snow fence erected and removed.

f) Monitor on an as required basis the erection and removal activities being carried out by the owner.

g) Replace any damaged snow fence materials upon determination that loss has occurred during prescribed fencing activities.

h) Negotiate with the landowner a reasonable fee to re-erect snow fence that inadvertently blows down after being properly erected. If a fee amount is not agreed to, it will be the responsibility of MTO to re-erect the fence in such circumstances.

The Owner agrees to:

a) Accept custody, care and control of the snow fence materials supplied by MTO for the length of time this agreement is in effect.

b) Erect the snow fence according to MTO specifications as documented in MTO Manual M-700 (copy of same to be supplied to owner).

c) Maintain and store the snow fence materials in a prudent manner either indoors on a concrete floor or if outside in a raised position not less than 10 cm (4 in) from ground level.

d) Use the snow fence materials only for use prescribed by MTO. Keep the snow fence materials in good repair and replace with new material any snow fence materials that become damaged by use or misuse beyond the prescribed use.

e) Ensure that the snow fence material is an item covered within the owner's existing fire insurance policy or any policy covering damage by weather or events outside the control of the owner.

The parties hereto mutually agree that:

1. This agreement may be renewed annually by utilizing the same materials in the custody of the owner and under the same terms and conditions as stated above with the exception that the yearly payment will be adjusted annually to reflect the yearly inflation rate as established by Statistics Canada.

2. The owner and/or MTO may elect not to renew the agreement at the end of the term as stated above and if the agreement is not renewed all snow fence material will be returned to MTO.

3. If this agreement is subsequently renewed for various periods up to a total of fifteen years, MTO will at that time supply new snow fence materials to the owner providing a new agreement is being entered into between the two parties.

4. MTO will assume any third party liability that may arise from the activities of erecting and removing snow fence by the owner in the same manner as if MTO were carrying out these activities.

5. If the operator of the lands on which snow fence is to be erected is a tenant rather than an owner, then the word tenant may be substituted by stroking out owner and adding the word tenant wherever required in this agreement.

PART B - LIVING SNOW FENCE

The two parties wish to enter into an agreement for the purpose of planting and maintaining a long term living snow fence on the owner's property in order to reduce snow drifting across the highway; in accordance with the following terms:

OWNER AGREES TO:

1. Provide a strip of land _____ m (_____ ft) wide and _____ m (_____ ft) long as shown on the attached sketch (Attachment B) on property known as Lot _____, Concession _____, Township of _____, County of _____.

2. Prepare site by deep ploughing and cultivating.

3. Assist MTO in planting the required number and species of trees/shrubs, if required.

4. Protect the planting from livestock and fire. This may include fencing which should be installed at an appropriate distance from the trees to permit the passage of maintenance equipment.

5. During the initial term of the Agreement, the owner shall provide seasonal cultivation in a manner consistent with standard tree cultivation practices until such time as MTO notifies the OWNER in writing that cultivation is no longer necessary (normally 2 - 4 years). MTO will pay the OWNER a lump sum of $_____/ha ($_____/ac) per year of actual cultivation payable after each year's last cultivation. Alternatively, MTO will pay the owner an agreed sum of $_____/ha ($_____/ac) for a pre-plant cultivation and/or herbicide treatment, followed by post-plant seeding to a recommended permanent vegetative cover.

6. To permit MTO access to the site for the purposes of inspecting or performing other work on the living snow fence.

7. Not remove trees or shrubs from the designated site.

MTO agrees to:

1. Plant the required number of species of trees used and shrubs according to MTO specifications.

2. Pay the owner the yearly lump sum amount as specified in item 5 above.

3. Be responsible for replacement of any trees and shrubs that do not survive for a period of up to 5 years.

4. Pay the owner an annual lease payment as compensation for the privilege of having a long-term living snow fence on the owner's land for the benefit of the public. This payment amount to be calculated as 1.2 times the average land rental rate for the respective area as established by Ontario Ministry of Agriculture and Food published data. This amount is calculated to be $_____ and payment will be made to the owner by April 30th of each year commencing with the year the trees are planted.

The parties hereto mutually agree that:

This living snow fence agreement shall be in effect and remain in force for a period of twenty years from the date of signing.

PART C - STANDING CORN CROP

The two parties wish to establish a standing corn temporary snow control windbreak in order to reduce snow drifting across the highway; in accordance with the following terms and as shown in Attachment C:

1. The agreement shall be from the ____ day of _____, 19___ to the day of _____, 19 ____, at which point the corn may be harvested or otherwise removed.

2. Owner agrees to maintain _____ rows of standing corn approximately _____ m (_____ ft) long in one continuous strip on property known as Lot ____, Concession _____, Township of _____, County of _____.

3. Owner agrees that the standing corn strip will be approximately _____ m (_____ ft) from the edge of the highway right-of-way adjoining the owner's property to the nearest row of corn.

4. MTO agrees to pay the OWNER for the value of the unharvested corn in the standing strip based on:

   a) the yield and value of the corn as established for the Township area by the Crop Insurance Commission of Ontario for the harvest year in question, times a factor of 1.5 to compensate for additional management time.

   b) the area of the corn strip as determined by the length of the strip multiplied by the number of rows of corn times the width between the rows to arrive at the area expressed as hectares.

5. Total area involved is _____ hectares (_____ acres).

6. MTO agrees to pay the OWNER and the OWNER agrees to accept a full payment for the standing corn strip the amount of $_____ with payment due by April 30, 19__.

7. Owner agrees to take necessary measures to prevent livestock from entering the area and damaging the corn crop snow control fence.

8. By accepting the above stated amount the owner agrees it will be full payment for all field preparation losses, any crop damage or inconvenience caused by the establishment or maintenance of the standing corn snow fence.

9. Upon the termination of this agreement, the OWNER may harvest the crop or deal with it in whatever manner deemed prudent and MTO shall have no further rights or obligations whatsoever.

10. Additional provisions include _____.

    e.g.: If an early winter storm damages the standing corn and it is not effective for snow control, then the owner may obtain permission from MTO to plough down the corn and the compensation amount would be amended in an amount agreeable to both parties.

(Attach separate page if required.)

****

ANY OR ALL PARTS OF THIS AGREEMENT completed shall be binding upon the heirs, executors, administrators, successors or assigns as the case may be of the respective parties hereto.

In WITNESS WHEREOF the parties hereto have executed this Agreement:

SIGNED, SEALED & DELIVERED
In the presence of:

MINISTRY OF TRANSPORTATION
OF ONTARIO

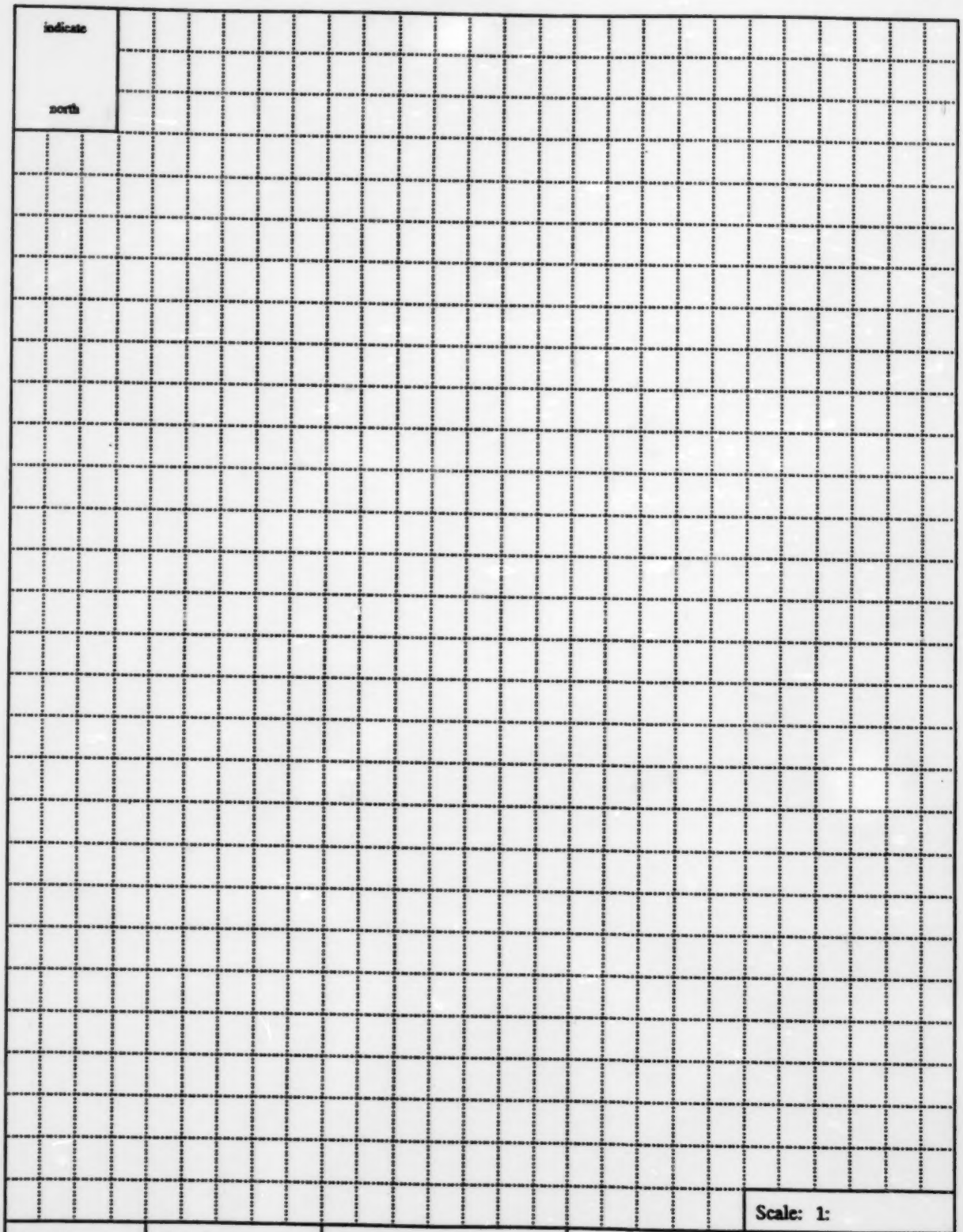
_____
WITNESS

_____

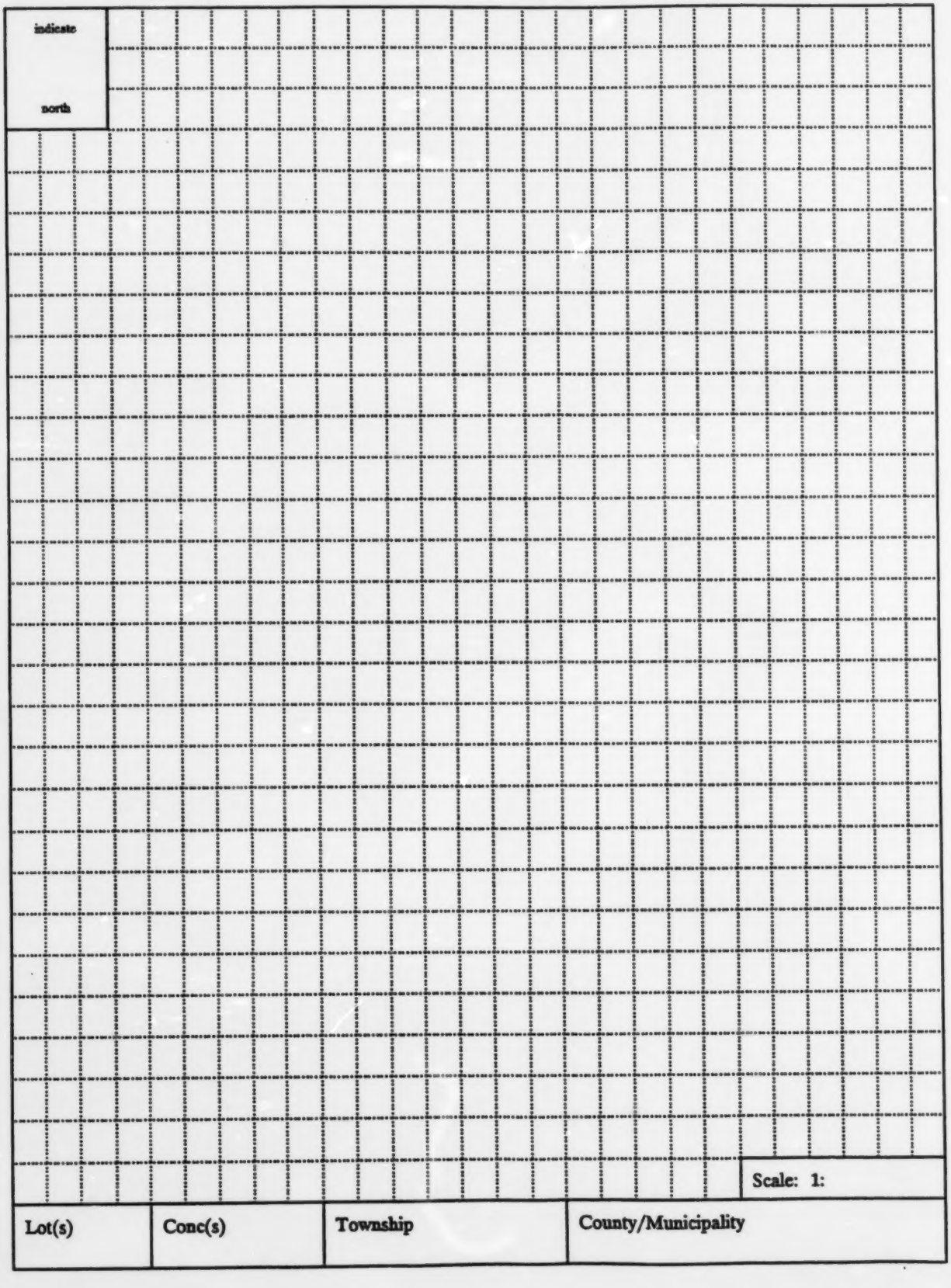
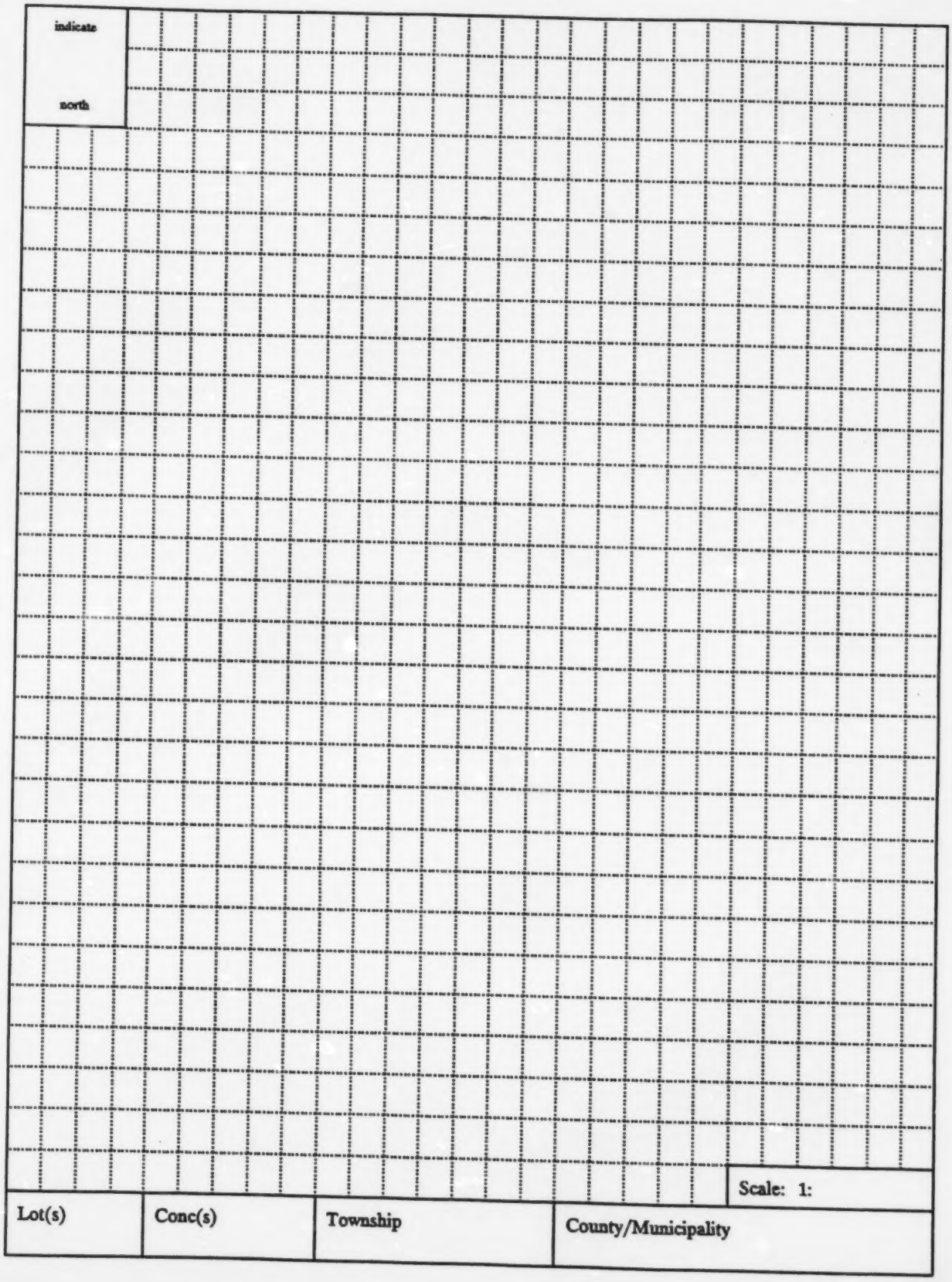
_____
WITNESS

_____
PROPERTY OWNER/TENANT

ATTACHMENT A



ATTACHMENT B



ATTACHMENT C